COAL AGE

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WE want each of our readers to *write a foreword for publication on this page.* Our request is purely a business proposition. Here are the details:

The article must be from five to seven hundred words in length. The subject is left entirely to the discretion of the writer, the only requirement being that the discussion shall confine itself to some phase of coal mining or coke manufacture.

Improved methods of ventilation, transportation, or mining, which eliminate waste and reduce costs, systems designed to safeguard employees, and practical schemes for the physical and moral betterment of the men are all possible texts for a short foreword that would be of much interest and infinite benefit.

And, don't forget the ethical questions that confront us. No permanent success can come to the industry if all our attention is concentrated on the pure science of engineering.

Perhaps some readers have frowned on our efforts to treat the moral side of human character, and have based their disapproval on the idea that an engineering paper must limit its attention and devote its pages exclusively to technical matters.

Such a deduction is wrong, and those who advocate this policy for "Coal Age" neglect to consider that a majority of the important people in the industry are not university trained; that the average individual in any occupation is wholly human; that a most intimate knowledge of our fellow beings is essential to intelligent management, and the latter is as desirable as ability to solve technical problems.

The day may come when coal mining in America will support and justify the publication of a journal which is pure science from cover to cover, but the time is yet distant. So long as a majority of those who are capable of writing on worthwhile subjects persist in their belief that concentrated wisdom lies in "getting, but not giving," just that long will the technical press work with one arm and two feet in a sling.

Our search for valuable coal-mining literature is limited to no one country, or any single language. We are catering to all intelligent coal men, and not to any particular class. Each individual need only read such matter as interests him in his special line of work. It's safe to say that few readers have so far mastered all the articles we have published which are of particular personal interest to them.

Nearly a million men are engaged in the production of coal in the United States; the cream of this great army of workers read "Coal Age." Hundreds of our subscribers have some valuable message which they could give to their fellow-workers. Let us have your ideas boiled to the bone, so we can print them on this first page.

Don't bother about the rhetoric or the literary style. We'll do what little varnishing is necessary. It's vital facts, helpful hints and plain truths we want Coal men are mostly plain people and human to the highest degree. Many men are writing for us who had never prepared anything for publication before. Ability was there, but encouragement and incentive were lacking.

We want to remove both hindrances. Consequently we propose to pay $20 for each article of the length and character before designated which is accepted for publication on this page as an editorial foreword.

The author's name will be printed, or withheld, just as he specifies. All articles not adapted for use as a foreword will either be published in some other part of our paper and paid for at regular space rates, or will be returned.

Resolve now that you will no longer "hide your light under a bushel." Remove the napkin from about your talents and stand up so you can see over the fence that surrounds your mine. A man's a fool to remain silent when he can say something to help himself and others. If you know what you want to say, it won't take more than an hour to write it, and $20 is fair pay for 60 minutes' work. Good jobs go begging because good men are unknown.

Central Coal Fields in Colorado

By F. W. Whiteside*

A description of the Walsenburg and Canon City districts, which are large producers of an excellent grade of fuel. Each field has central power installations, and the local boiler plants at the different mines are being dispensed with. Interesting description of an aerial rope tram about a mile long for conveying mine cars.

*Chief engineer, the Victor-American Fuel Co., Denver, Colo.

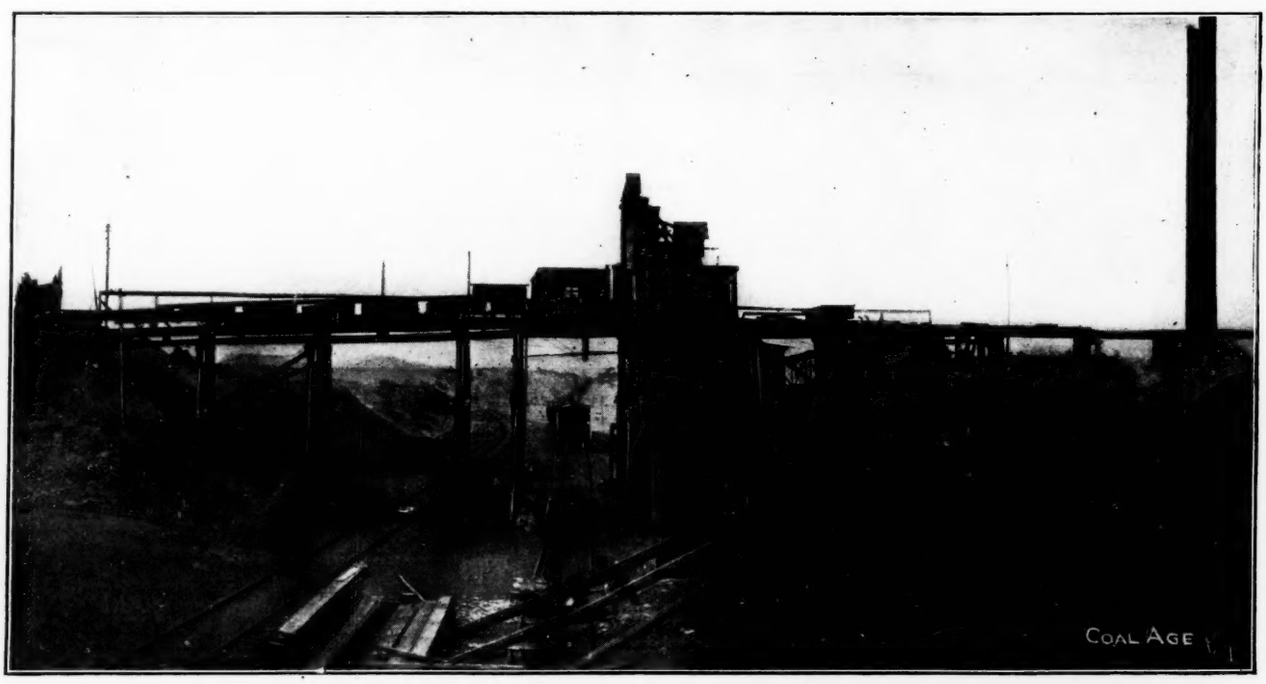
While the coal measures of Huerfano and Fremont Counties do not join, their geological age and location, as well as their physical characteristics, are so closely related that I have undertaken to describe them in a single article, although it is proposed, for the greater part, to handle each separately.

The Walsenburg Field

As the name of this district would indicate, Walsenburg, a town of 4000 inhabitants, is the commercial center and principal railroad point in the field. It is the county seat of Huerfano County, and one of the most enterprising towns in the southern part of the state.

The Colorado & Southern and the Denver & Rio Grande railroads, both of which pass through Walsenburg, handle the entire output of this district, with the exception of a small percentage used locally in the domestic trade.

None of the properties are located directly within the town, the nearest mine being about one mile, while the farthest is 12 miles distant.



General View of the Magnet Mine of the Rocky Mountain Fuel Co., in the Canon City Field

A large percentage of the production of the district is shipped north to Pueblo and northern Colorado points, and from Pueblo east to Kansas and Nebraska. The Trinidad district,* 40 miles south, is also shipping a large tonnage to Pueblo, and the result is that the joint track of the Colorado & Southern and Denver & Rio Grande, the only line between Walsenburg and Pueblo, has been the busiest piece of single track in the United States, if not in the world. So numerous, indeed, were the trains that it was customary to operate them in fleets, as many as 30 trains comprising a fleet. During the past two years, the two roads above named have completed a new double-tracked line, with easy curves and favorable grades, thus providing the district with three tracks to handle its north-, east- and west-bound output.

The Walsenburg is a continuation of the Trinidad field, belonging to the Raton Mesa coal region, which occupies a hilly country east of the Rocky Mountains on the border of the Great Plains and Cordilleran provinces. It lies wholly within the boundaries of Huerfano County, and its separation from the Trinidad field is purely geographical.

*For a description of this field see Coal Age, Vol. 1, pages 632 and 664.

Geology

The coal measures are found in the Laramie formation, which rests upon the Trinidad or basal sandstone, which, in turn, overlies the Pierre shale. From the fossils found in this shale by Dr. T. W. Stanton and G. B. Richardson, the former is inclined to identify the Pierre shale with that of the Canon City district and the Denver Basin.

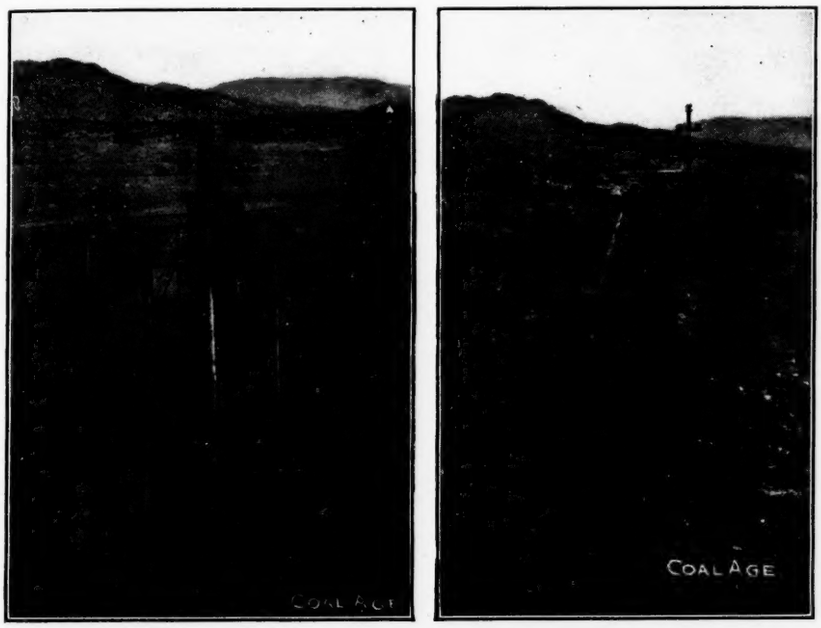
The district contains approximately 193,500 acres between the south county line, the eastern and western outcrops, and the known northern boundary of the field. But as only those areas at and near the outcrop have been worked, the exact nature and extent of the coal in the interior of the field is a point yet to be determined by deep mining, as much of it has from one to two thousand feet of cover.

As in the case of the Trinidad field, the stocks which form the cores of the Spanish Peaks undoubtedly destroyed large areas of valuable coal in the southwestern portion of the field, and the dikes which radiate from these central cores have done likewise.

In the northwestern end of the field the coal measures are concealed by the overlap of the Poison Cañon formation; it is not known to what extent, if any,

the measures continue north and west of this overlap.

The direction of the dip constantly changes from a course of S. 86° 30′ W. in the southeast, to practically S. 15° 0′ E. in the northwest end of the field, thus making a basin in the interior. Only the lower group of coal beds is worked, the middle and upper being either poorly developed, or entirely absent.

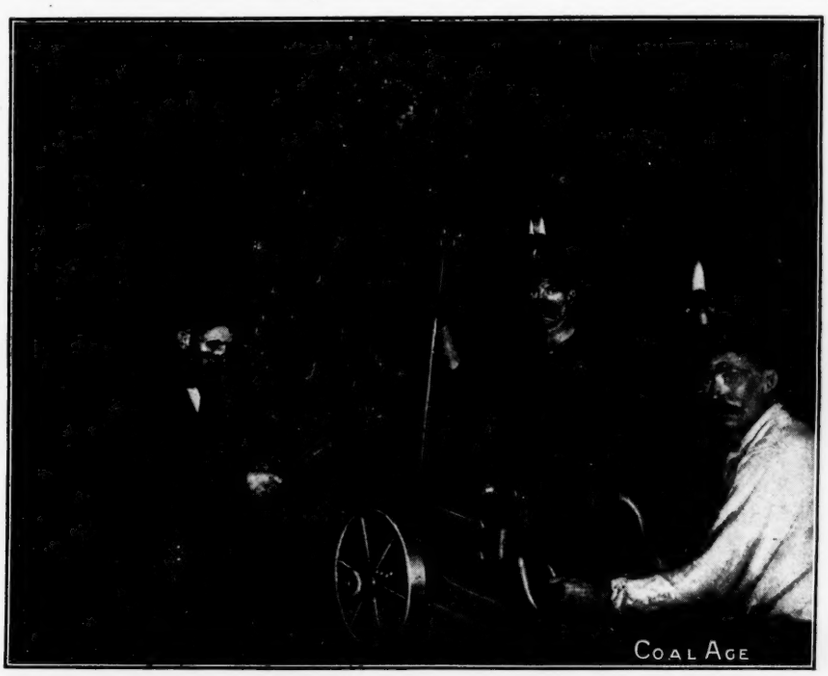


THE LAWSON AERIAL TRAM FROM THE LITTLE MINE TO THE RAILROAD

Within a zone of 250 ft. above the top of the Trinidad sandstone are found from two to eight coal seams, varying from 1½ to 7 ft. in thickness. Of these, only three are worked; they are, near Walsenburg, the Cameron, Walsen and Robinson, and north of what is known as the Hogback or Big Dike located about a mile northwest of Walsenburg, the Maitland, Lennox and Monarch seams.

In the extreme western portion of the district, near the town of La Veta, the coal measures turn up on edge, the outcrop making a comparatively straight line, with the coal seam standing vertical and in some cases slightly overturned. Only the lower series has been prospected, the two seams corresponding to the Maitland and Lennox being the only ones developed at the present time.

The smaller sizes are washed at some of the mines, and the resulting product is a very desirable domestic fuel. The roof is either of shale or sandstone and requires careful timbering, especially the former.



PUNCHER MACHINE IN THE TIOGA MINE OF THE TIOGA COAL CO.

ANALYSIS

The coal is noncoking, bituminous and of excellent quality. It finds a large market for both steam and domestic purposes.

The two analyses following were taken from samples obtained in the extreme northern and southern parts of the field, respectively:

	Northern	Southern
Fixed carbon.....	50.1	43.8
Volatile	34.0	34.3
Ash	11.8	11.7
Moisture	4.1	10.2
B.t.u.	10,863	12,397

It will be noted that the percentages of volatile and ash are practically the same in each case, the fixed carbon and moisture showing the greatest difference. In practice, it is found that the northern coals burn with less soot but do not store so well nor furnish such great heat as those from the southern portion.

The following analyses show the maximum and minimum of the different constituents found in this field, together with an average for the district:

	Range	Average
Fixed carbon....	40.4 -52.4	49.1
Volatile	34.5 -36.9	36.1
Ash	8.8 -19.2	12.3
Moisture	1.3 - 4.3	2.5
Sulphur	0.55- 1.06	0.7
B.t.u.	10,744-13,043	12,227

POWER PLANTS

While a large number of the operators in the district generate their own power, the Trinidad Electric Transmission Railway & Gas Co. proposes to furnish electric power at a cost per horsepower-hour much less than the individual operators can duplicate. The Walsenburg branch of this company, as at present laid out, will be able to furnish 2000 kw., and the plant is so designed that more boilers and turbo-generators can be easily added to the present equipment, as they become necessary.

A large amount of electrical power is consumed in the district, the usual voltage underground being 250 direct current; on the surface, both direct and alternating current is used. The direct-current voltage is usually maintained at 250, although occasionally 500 is found. The maximum transmission-line voltage is 23,000. Very little compressed air is used. Machine punchers, pumps, etc., are all driven by electric power.

There are 30 important mines in the district, of which 24 are slopes, three drift, and three shaft mines. Of the entire number, 21 are fan and 9 furnace ventilated.

THE CANON CITY FIELD

The Canon City coal measures are located on the east front of the Rocky

Mountains in south central Colorado, and lie entirely within the borders of Fremont County. Canon City, being the largest of the nearby towns, has given its name to the district. It is a small but beautiful city on the Arkansas River, situated a short distance east of the mountains in an extensive orchard district. About eight miles down the river is located the town of Florence, the headquarters of the vast Florence oil field.

The Denver & Rio Grande, the Atchison, Topeka & Santa Fé and the Florence & Cripple Creek railroads handle the entire business of the district. The various coal properties are located to the south of the Arkansas River, and their output is delivered to Canon City and Florence by numerous spurs, the longest haul being eight miles.

On account of its many excellent qualities, the coal mined in this district finds a ready sale to the west, north and east, being shipped in large quantities to all the big metal-mining districts in the vicinity. It is also shipped to northern and eastern towns in the state, and to many points in Kansas and Nebraska, where vast quantities are stored during the summer season to provide for winter business. The smaller sizes are usually washed and find a large sale for domestic use.

Geology

The Canon City coal measures occupy a small mesa at the foot of Wet Mountain and west of the broad valley of Pierre Shale, in which is located the Florence oil field. The coal beds occur in the Laramie, which rests upon the Trinidad or basal sandstone. The Pierre shale, upon which the Trinidad sandstone rests, is a body of consolidated sea mud, with thin beds of sandstone, and at rare intervals a 2-in. band of limestone. The total thickness of this shale here is 4500 ft., while in the Walsenburg district it is only 1000 ft.

The Trinidad sandstone attains a maximum thickness of 100 ft. For some 50 ft. below it, sandstone and shale are found in nearly equal amounts, but these are usually assumed to be sandy portions of the Pierre shale.

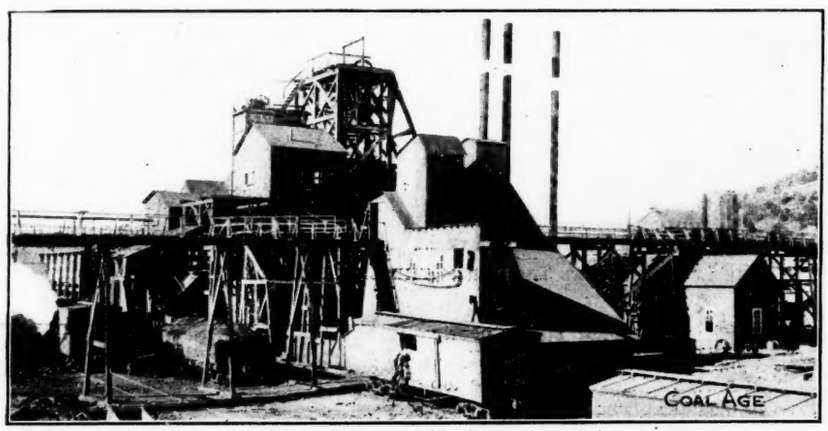
The Laramie formation in which the seams occur, is coal-bearing only in the lower 700 ft., covering an area of 23,300 acres. As none of the seams appear to be continuous for any great distance, it is difficult to positively identify a given seam in different parts of the field.

There appear to be five coal horizons which, in order of their altitude above the Trinidad sandstone, are as follows: The Fremont, Rockvale, Coal Creek and Bluff Springs horizon, resting directly upon the basal sandstone; 100 ft. higher, the Nonac and Diamond horizon; 215 ft., the Radiant, Ocean Wave, and Magnet horizon; 515 ft., the Chandler and Littell horizon, and 650 ft., the Brookside and Brilliant horizon.

Unlike the coal measures in the southern part of the state there is little, if any, disturbance, due to igneous intrusions. Along the western boundary, the measures are sharply upturned, due to the overthrust at the foot of Wet Mountain. This fault cuts across the deposit in the southern part of the field, and marks its course by a complete overturning of the measures.

Along the eastern outcrop, the seams pitch nearly due west, the maximum being about 5½ per cent. North of Williamsburg, the pitch begins to swing in a southerly direction, and at Brookside it is nearly due south. On account of the upturned strata on the west line of the field, the pitch soon becomes very steep and assumes an easterly direction.

The roof overlying the coal is of shale or sandstone, the former predominating. It varies greatly in hardness, and requires careful timbering, especially after being exposed to the action of fresh air and moisture.



Pinion Mine of the Rocky Mountain Fuel Co. in Huerfano County

Analysis

The coal is bituminous, noncoking, and the best domestic fuel mined in the eastern part of the state. The following analyses were obtained from two samples taken in the extreme north and south portions of the field:

	Northern	Southern
Fixed carbon	49.9	44.1
Volatile	33.3	34.8
Moisture	11.1	11.2
Ash	5.4	9.9
B.t.u.	11,425	10,730

The moisture and volatiles vary only slightly, the principal difference being in the percentages of ash and fixed carbon. In general, on account of the low moisture content, the coal stores remarkably well and commands a large sale throughout the year.

The following, compiled from 12 analyses made from samples covering the entire field, may be taken as typical:

	Range	Average
Fixed carbon	36.6 -53.2	45.2
Volatile	30.3 -38.0	34.1
Moisture	5.5 -23.2	12.0
Ash	2.3 -22.6	8.7
Sulphur	0.43- 3.03	0.87
B.t.u.	9,293-11,880	10,859

These results were obtained from analyses made by F. M. Stanton, chemist-in-charge U. S. Geol. Survey.

Power Plants

As in all the other coal districts of Colorado, a number of the operators still generate their own power. The Arkansas Valley Ry., Light & Power Co., located at Canon City, has this and the adjoining territory so well covered by transmission lines that the operators are abandoning their power equipment as it becomes worn out, and buying power from this company. The latter has a plant with a capacity of 4000 kw., besides which it is electrically connected with two other large plants. The usual mine voltage carried is 250, both above and below ground. Compressed air, in a very few cases, is still used.

There are 14 important mines operating in the district, of which 10 are slopes and four shafts. Eight have fans, two are furnace ventilated, and four are ventilated by natural draft.

Haulage Systems

In the two districts here described there are 37 slope and drift mines, and rope haulage in its various forms is very generally used. Where conditions permit, the single main rope is in vogue, but the majority of the mines are worked by the main- and tail-rope system. The shaft properties are ordinarily operated by means of the usual two-compartment shaft, a few of the smaller using a single compartment only.

The Little is the deepest coal shaft in the state, being 1065 ft. in depth. As this property is about a mile from the nearest railroad, and as there appears to have been some difficulty in getting a line to the mine, a Lawson aërial tram was installed. With this installation, four galvanized strand cables, carried upon towers, serve as the rails for carrying the coal cars from the shaft to the screens, the cars being drawn by an endless rope. This gives a double-tracked tram line, with a separate track for the loads and empties, the most important difference

being that the cars ride upon ropes instead of the ordinary steel rails. This tram presents many advantages in snowy and bad weather. The greatest difficulty in upkeep seems to be in maintaining the ropes of each track at equal altitude and tension.

Generally speaking, the coal seams are thinner than in the Trinidad district, so the cars are usually smaller and consequently of less capacity.

For a description of the methods of ventilation and lighting, the preparation and handling of the coal, the reader is referred to my article on the Trinidad district, which appeared in COAL AGE, Nos. 20 and 21. This applies equally well to the districts under discussion.

METHODS OF MINING

The usual room-and-pillar system of mining is followed where the coal exceeds 4 ft. in thickness. Below that height, the longwall advancing method is most generally employed.

In the entire state, there are approximately 230 mining machines in use, a large percentage of which are in Huerfano and Fremont Counties. All of the standard makes are found. Drilling is done by hand, to a great extent, and the shots fired by regular shot firers employed for that purpose. Little gas is encountered, and but few accidents due to explosions are recorded against the history of these districts.

The miner here is paid a better price per ton than in the Trinidad field, but owing to the hardness of the coal, the thinner seams worked and the consequent increased difficulty of mining, the monthly earnings are practically the same. Of the 14,800 coal miners in the state, 3500 are employed in the Walsenburg district and 1450 in the Canon City.

THE C. F. & I. CO.'S WALSEN MINE

All dry entries are sprinkled to keep down the dust. As the Walsenburg mines are situated in a much drier district than those in the Canon field, they require less pumping, but more careful sprinkling. The operators are taking up the stone-dust proposition and it is finding favor in some of the mines. It appears to be a good idea, and will probably become popular as soon as the benefits to be gained by its use are better understood.

Great attention is paid to first-aid work at the mines of both districts; regular classes meet and instruction is given by the company surgeon, or some other competent party. Practice work with helmets is kept up in a like manner.

PRODUCTION

	1909	1910	1911
State production..	10,772,490	12,104,887	10,127,595
Walsenburg.....	1,867,424	2,443,491	1,728,420
Canon City.....	612,803	712,098	623,044

From the above, it will be seen that 1911 was a poor coal year in Colorado. This condition well indicates the depression which was felt over the entire country. The production of coal is so closely related to all business and commercial enterprises that it constitutes a very accurate barometer of business conditions.

The Hastings, Colo., Mine Disaster

By F. W. Whiteside*

The Hastings explosion occurred in a new mine which was quite wet, but the workings of which showed some gas. The cause is ascribed to an improperly fitted gasket in a Wolf lamp. The force of the explosion was heavy and the rescue work was seriously impeded by numerous falls.

*Denver, Colo.

The Hastings mine, of the Victor-American Fuel Co., located 16½ miles north of Trinidad, Colo., on the Colorado & South-Eastern Railroad, was first opened in 1888.

GENERAL CONDITIONS

Until the year 1908, the entire daily production, amounting to 1500 tons, was mined in the upper, or what is now known as the "A" seam, which varies from 5 to 7 ft. in thickness. In August of that year, a new slope was completed from the "A" through the intervening measures to the "B" seam. The vertical distance between the two seams averages 40 feet.

For some time the "A" seam workings have been retreating, and have been furnishing the greater percentage of coal, hence, after the completion of the new slope, the development of the "B" workings was not pushed until within the past 18 months. At the present time, the "B" seam produces 12½ per cent. of the daily output.

While few of the Trinidad district operations are wet mines, the workings going to the dip always make a certain amount of water. In this respect Hastings is no exception, the lower seam especially being particularly wet. The sprinkling problem is, therefore, a very simple one, and so far as dust is concerned, Hastings has always been considered one of the safest mines in the district.

This mine has always made a small amount of gas, but this has been offset by an ample quantity of air, furnished by a 90x90-in. Sirocco fan which can, at any time, be speeded up to furnish double its ordinary running capacity. None but the latest and best types of safety and electric lamps are used in the mine, no open lights being permitted under any circumstances. All lamps are filled, cleaned and inspected by the company inspectors before being carried underground.

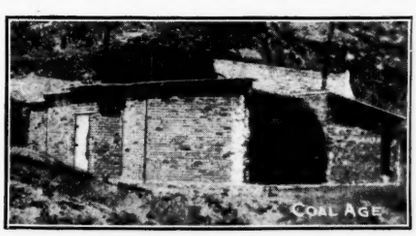


FIG. 1. THE HASTINGS 90x90-IN. SIROCCO FAN

Permissible powder, in individual allotments sufficient for a single shift, is used exclusively. The shots are tamped with adobe and discharged by regular shot firers.

All places are examined after the evening shots are fired, and again before the day shift goes to work in the morning. The mine is inspected daily by the company's regular inspector, and at frequent intervals, by its chief inspector who was at one time deputy state coal mine inspector.

THE EXPLOSION

On the night of June 18, the night shift working in the "B" seam, went into the mine as usual. There were 13 men in these workings when the accident occurred, as follows: One fireboss; two rockmen; one pumper; one driver and 8 miners. The fireboss was a Welshman, and the balance of the men were Greeks, Italians and Montenegrans. Only one

man escaped, No. 13 (see map), a Greek; although injured about the head from flying timbers, he will probably recover. His partner, No. 10, working by his side, was killed by the flying débris.

The shift boss was in the "A" seam when the catastrophe occurred, and he, as well as the other men in those workings, was not aware of the trouble below until some time after it happened.

The explosion took place at 9:30 p.m. About 9:45, one of the first aid team, which was having practice in the emergency hospital near the pit mouth, noticed the odor of fire, and going to the door, discovered smoke issuing from the mine. The alarm was immediately given and Superintendent James Cameron, in company with A. E. Thompson, the Hastings mine inspector and Harry A. Winters,

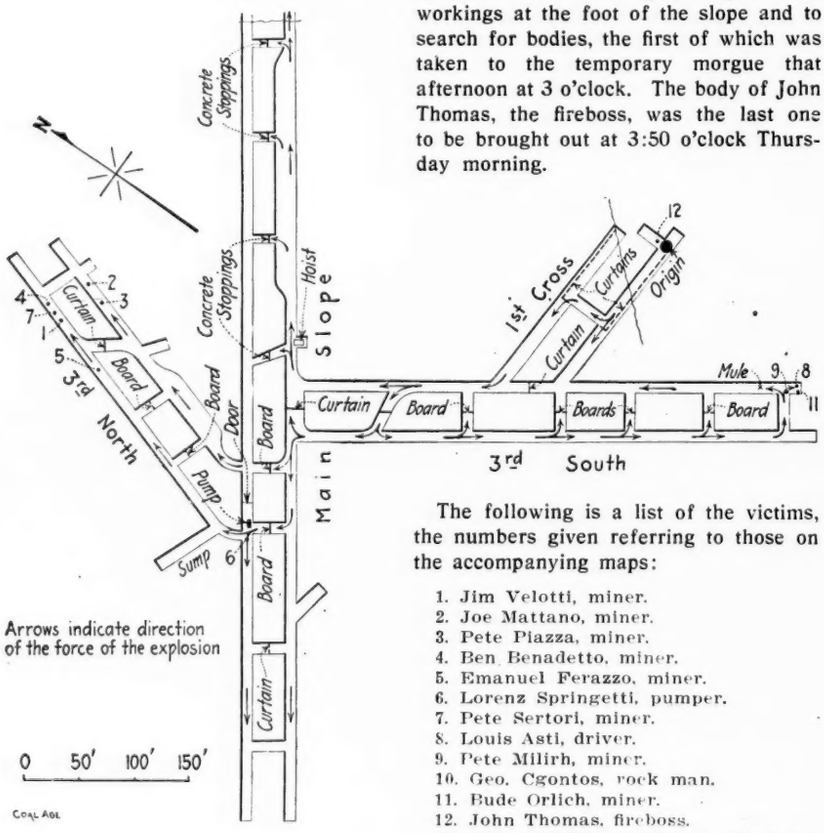


FIG. 2. DETAIL OF WORKINGS NEAR SCENE OF EXPLOSION

lamp inspector, went in as far as the bottom of the air shaft in the "B" seam, Thompson, a little later, getting as far as the No. 1 South entry.

In the meantime the helmet men, under the direction of their captain, D. H. Reese, had fallen in, and at 10 o'clock entered the mine. The first helmet shift numbered 6 men, and worked without ceasing until 4 in the morning. The first men found were Nos. 10 and 13; the latter was taken outside immediately and will undoubtedly recover as already mentioned.

The main air course, the Nos. 3 North and South entries were explored, this first examination being in search of any possible living men and to determine the presence of fire, if any existed. Seven bodies were found but were not taken out at this time.

In the meantime, a force of 22 men were putting up brattices, to replace the concrete stoppings, all of which were blown down. This was not accomplished without difficulty, as, owing to the caved condition of the main slope, all material had to be lowered into the "B" seam air course through the air shaft at the outbye end. The air course itself was in very fair condition.

At 7 o'clock Wednesday morning, Reese, with 20 men, most of them equipped with helmets, again entered the mine to more thoroughly explore the workings at the foot of the slope and to search for bodies, the first of which was taken to the temporary morgue that afternoon at 3 o'clock. The body of John Thomas, the fireboss, was the last one to be brought out at 3:50 o'clock Thursday morning.

The following is a list of the victims, the numbers given referring to those on the accompanying maps:

1. Jim Velotti, miner.
2. Joe Mattano, miner.
3. Pete Piazza, miner.
4. Ben Benadetto, miner.
5. Emanuel Ferazzo, miner.
6. Lorenz Springetti, pumper.
7. Pete Sertori, miner.
8. Louis Asti, driver.
9. Pete Milirh, miner.
10. Geo. Cgontos, rock man.
11. Bude Orlich, miner.
12. John Thomas, fireboss.
13. Geo. Cgehlakes, injured; taken out alive.

CAUSE AND EFFECT OF THE EXPLOSION

In Fig. 2 is shown the point of origin and direction taken by the force of the explosion. A number of theories have been advanced as to the exact cause. It was thought for a time that a spark from the electric pump might have set off a body of gas formed, possibly, by the last shots fired after the day men had retired from the mine. This theory was not borne out by the condition of the bodies found, nor by the direction of the explosion, as will be shown later.

It was also thought, for a time, that a blownout shot in the back entry of the No. 3 South near the face, had set off a possible body of gas, and had traversed the last crosscut separating this entry from the main. This would account for the fact that the bodies of the three men were hurled into the face of the No. 3 South Main with tremendous violence, while a car of coal and the body of a mule were thrown outbye.

After ventilation was restored so that the south workings could be explored without the use of helmets, it was found that a considerable body of loose rock, which had been piled along the rib of

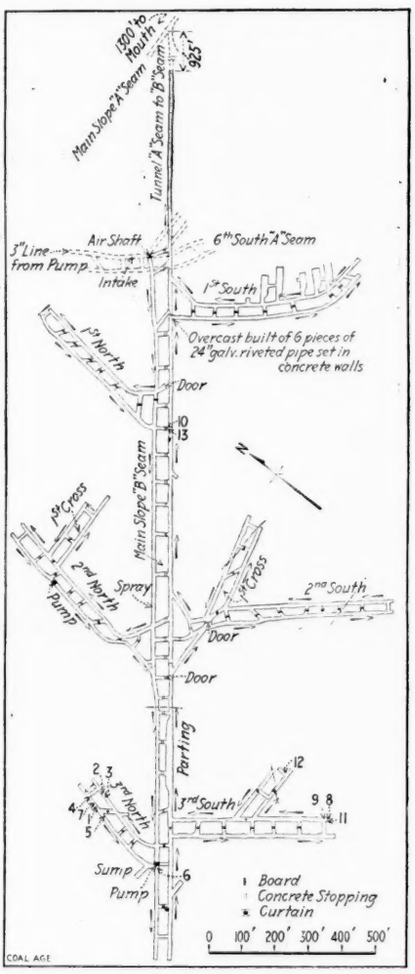


FIG. 3. MAP OF THE "B" SEAM WORKINGS IN THE HASTINGS MINE

the back entry of the No. 1 Cross entry off the No. 3 South had been hurled into the latter entry; it then began to look as though the explosion had originated in the cross entry.

The body of Thomas, the fireboss, was considerably burned, but not badly mutilated, and this, for a time, seemed to disprove the theory that the explosion originated at or near him.

A DEFECTIVE SAFETY LAMP

Upon examining his Wolf Lamp, it was found that the bottom gasket upon which the glass globe rests, had, in some

manner, become folded over so that a crack or crevice was left between the bottom of the glass and the bearing on which it should rest. It is now thought that the gas was fired in this way, there being perhaps only a sufficient amount to convey the fire to the No. 3 South, where a larger body was encountered, which propagated the explosion. This theory is strengthened by the following facts:

The bodies of Nos. 8, 9 and 11, although very badly broken and evidently

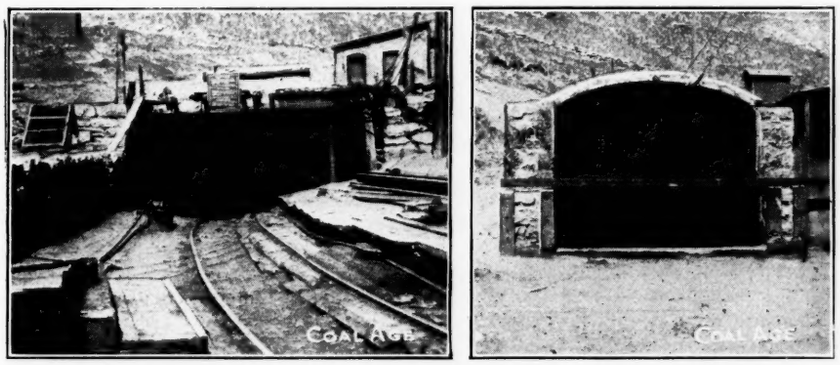


FIG. 4. MAIN AND MANWAY ENTRANCES AT HASTINGS

hurled with great violence against the face of the entry, were not seriously burned.

The mule was hurled outward and was practically torn in two, although not seriously burned.

The pumper, No. 6, was burned, but probably not sufficiently to cause his death, and it would appear that he, like Nos. 1, 2, 3, 4, 5 and 7, met his death by suffocation, caused by the afterdamp.

The bodies of Nos. 10 and 13 up the main slope, were only slightly burned. Had No. 10 been so fortunate as to escape the flying timbers, he would have been taken out alive.

There were a few cars standing on the slope near the mouth of the back entry of the No. 3 South, and these seem to have been subjected to practically equal forces traveling in opposite directions, as they were turned completely around and badly broken up. The deposit of coke dust on the timbers was very plain and tended to prove the correctness of the direction of force, as shown by the arrows in Fig. 2.

The stoppings between the main slope and air course were built of concrete, approximately 20 in. in thickness, and backed with rock. These were all blown from the main entry toward the air course. Two stoppings in the "A" seam were blown out, but, with this exception, no other damage was done there.

A trip of 18 cars was standing on the slope between the Nos. 1 and 2 North entries and while this was heavily covered with fallen rock and timbers, it was not otherwise disturbed. The haulage rope fastened to this trip was so deeply buried that after detaching it from the trip, it was found impossible to pull it out; it was necessary to cut the rope in order to operate the hoist for bringing in new timbers and taking out wreckage.

In the section where the explosion was most violent it is probable that half a dozen pit cars of rock would represent the amount of falls from the roof. But from this point outward very few timbers were left in the slope, and occasional falls from the roof blocked the entry. All timbers were blown out in the rock tunnel.

FIG. 5. A CORNER OF THE LAMP ROOM AT THE HASTINGS MINE

RESCUE WORK.

It is but fitting to pay a tribute to the men who explored the mine after the explosion. Seldom is the rescue work in an accident of this kind more systematically handled than in this case.

Besides those already mentioned, among the many who risked their lives in the rescue work should be named Assistant Engineers J. E. Hanes, F. S. Dunlevy, Lewis Hufty and L. M. Kuhns. Superintendents and men about the mines: John Yates, N. Bivens, J. Wennberg, J. Walker, J. F. Randock, E. Hart, Archie Bell, Fred Cornish, J. Milton, W. H. Cunningham, W. Wilcox, J. Walker, Jr., J. E. Cameron, Robert McCune, Andy Young, Tom Barron, Pat Gallager, Geo. Smith, J. P. Bares, Wm. Mates, Jas. Brown, Ed. Flynn and others.

The Government Rescue Car No. 2, in charge of J. C. Roberts, was in Colorado Springs when the accident was reported, and came to the scene on the first train. Mr. Roberts rendered especially efficient service.

Mr. King, deputy state coal mine inspector for the Trinidad district, was on the ground at 7 o'clock the morning following the explosion. Chief Inspector Dalrymple and two other deputies arrived on the evening of the same day; all worked untiringly.

An accident of this kind would seem to point to the futility of human effort in its endeavor to provide a safe mine. Every known precaution was taken to safeguard the men in the Hastings mine, yet so slight a thing as an impaired asbestos gasket was sufficient to wreck the mine and cause the death of a number of men.

Experiments have shown that unless there is an unusually large amount of dust in suspension in the air, ignition does not take place from a naked flame. Dust explosions are the result of violent compressions simultaneously with the production of a large flaming area by the charge of the explosion.

Coal Mining Institute of America

The 56th annual meeting of the Coal Mining Institute of America met at 10 a. m., June 25, in the Library Building at Johnstown, Penn. The president of the institute, A. W. Calloway, was called away shortly before the meeting assembled. Consequently Vice-president Jesse K. Johnston opened the session as chairman.

C. S. Price, president of the Cambria Steel Co., was not feeling well enough to address the institute as had been planned, so John Fulton, consulting engineer of Johnstown, took his place and made an address of welcome.

Jesse K. Johnston made the opening address. He spoke on compensation, regarding its introduction favorably. He thought that the great demand for labor in other pursuits than mining would result in a restriction of the mining force and that fewer men would mean lessened increase of production with consequent restoration of coal prices to a level which would permit of profitable operating. The institute then discussed the subject, "Weak Links in the Operating Chain."

Why Examine Mine Foremen?

S. A. Taylor, dean of the School of Mining, University of Pittsburgh, opened the debate by condemning the choosing of mine foremen solely by means of an examination. He felt that men of marked executive ability found it hard oftentimes to meet the demand of the examining board. Consequently much excellent material was deliberately cast aside.

He was not opposed to labor unions but felt they had a natural place in the industry, but he did feel that some men in lower official positions in the union found more delight in treaty and investigation than in mining work and labored continually to create strife and dissension. Thus the purposes of the union as interpreted by these men of narrow mind and insufficient moral direction were destructive rather than constructive and resulted in unnecessary and harassing controversies injurious both to workmen and operator.

The loss was made greater by the fact that the latter was usually unable to meet the situation with an intelligent understanding of the workers' needs. He felt that the operator rarely put himself in the place of the discontented man endeavoring to realize his viewpoint. With a few conditions of difficulty troubling him, the miner was apt to lay undue stress on some matter which really was trivial and such as would so appear to any man having broader and more varied experiences and duties.

Editorial Correspondence

The summer meeting of this institute was held at Johnstown, Penn., and was largely attended. No papers were read, but an animated discussion on the relative duties of mine officials took place, followed by a question-box discussion. The first-aid and sight-seeing features were unusually interesting.

Psychology and Sociology in Mine Management

Mr. Taylor finally urged that all persons entering the industry with the intention of becoming executive officers should become acquainted with psychology, sociology and the science of management. The University of Pittsburgh had introduced a one-year course to be studied by those who had already qualified as mining engineers. He was not confident that this course was satisfactory in all its branches but he invited criticism and promised those who tendered it the most diligent hearing.

John Fulton spoke favorably on the mine foremen's examination, which, he said, was not to be condemned when it failed to eliminate those who were unfitted for the duties of the foremanship by weakness of will and lack of foresight. The elimination of those who did not have executive ability could be safely left to the operator. The state only endeavored through the examination to strike out the names of all those who were unfitted by lack of knowledge to be guardians of the lives of the miners and others who might thereafter be placed under their care.

W. R. Calverley, general superintendent, Berwind-White Coal Mining Co., discussed the great change which had taken place and was still developing in the character of mine labor.

Bath Houses

M. J. Moore, general superintendent of mines of the Cambria Steel Co., declared that with John Fulton he believed in the installation of good wash houses at every mine. He felt that the miner did not like to return to his home, village or town in the dirty clothing in which his labors were necessarily performed. He believed that the building of wash houses should be compulsory and that the miner should be compelled to use them. The Cambria Steel Co. expected to spend about $20,000 on a wash house. He thought that thereby an increased life of the improvements in tenement houses would be secured. The miner returns to his rented home with dirt enough to spoil the appearance of the dwelling.

C. L. Fay said that the introduction of bath houses had resulted in increased self-respect among the anthracite miners and urged their further introduction and use. T. A. Mather, state mine inspector, said that the mine foreman was the key to the situation, both as to safety and efficiency, and an increased sense of responsibility should be driven home. He declared that the mine foremen permitted the waste of large numbers of props and of much rail. He urged that whatever measures of discipline were adopted should be made general so that men could not escape the needed discipline by merely moving from mine to mine. A few remarks from J. W. Paul, engineer in charge of rescue work at the Bureau of Mines, closed the morning session.

R. D. Hall declared that we were advancing too rapidly along paternalistic lines. We may need to take better care of the working man, to watch him at his work and see that he performed it as directed. We may have to increase the number of assistant bosses, rib bosses and timber men, especially that thereby the foreign working man may be protected. But before all else we should remember that safety and efficiency can only be obtained by the efforts of the working man himself. Little can be done by direction. The union, the first-aid corps, and every influence around the mine should be devoted to the defense of the miner from loss of life and efficiency.

Not Only the Idle are Non-productive

The working man must learn that he should be his own mine foreman and, so far as he knows what to do, should do it, and he should endeavor to learn what he needs to know about the risks of his work. The mine inspector, the mine foreman in his legal actions, the assistant foreman, the rib bosses and timbermen, even the firebosses, are nonproductive elements in society. They are necessary because men do not know how to protect their lives or, knowing, will not try to guard them.

We cannot do without these nonproducers because of the universal presence of ignorance and folly, but the workers can supplement the work of safety and make it effectual if they will, and they can make an increase in the number of such men unnecessary. Every man who does not labor toward production or education is unproductive and the nonproducer must be supported by the working man whether the unproductive man is one of the idle rich, or an inspector or foreman. The cry of the working man

should be not for more inspection, but for more mutual constraint.

At the Pine Hill Colliery the miners are directed on the backs of their semi-monthly statements to warn one another of danger and told not to assume that any man knows just what he should do or should not do. He should be told his duties in any event, whether he knows them or not. No man has done his duty by his fellow men unless he has endeavored to keep them from dangerous practices in their work. Of course, this would not require any man to leave his place to visit another room. But men can warn their fellows when traveling to and from their working places.

Dusty Mines

The chairman then gave place to Nicholas Evans, one of the state mine inspectors, who opened up the question box with the query:

Inasmuch as large volumés of air sweeping through the entries and working places of a mine (in winter time especially) absorb appreciable amounts of the natural moisture of the mine, thereby tending to make it dusty, and assuming that the legal Pennsylvania minimum of 150 cu.ft. per minute is enough to dilute, carry off and render harmless all gas; is not the practice of most mine managers in furnishing from twice to three times as great a volume of air as that required by law one that increases danger?

W. S. Gay stated that the question resolved itself into two parts, a question of velocity and of volume. He considered high velocities were undesirable, that they serve to confine gases wherever no provision had been made for direct ventilation. While a slow current will circulate into places to which the stoppings do not direct it, a rapid current seeks to take the shortest line available between two points and fails to ventilate any areas not directly in its route.

This statement met with some discussion, but W. S. Gay gave evidence which in his mind clearly established the correctness of his position. S. A. Taylor called attention to the fact that large quantities of air dried the mines and made them dangerous. It was pointed out that the increased quantity of air increased the dryness only when it passed through a single airway and was not saturated. When more airways were provided so that the velocity remained the same, the air had a larger area to dry and did not have consequently a proportional dessicating effect on any given square foot of surface with that which it would have, if passed through the usual number of airways and at greater speed.

Increase in Explosions

The next question discussed was:

Regardless of their cause, i.e., dust, or gas, or blown out shots, why are we now having a higher percentage of explosions per number of mines operated, than ten years ago? Is the climate changing? Or is it due to the personnel of the management? Or to our system of mining? Or—What?

J. K. Johnston denied that there was an increase in the number of explosions in consideration of the number of mines in operation. He quoted the Weather Bureau to show that the climate was not changing, the rainfall, snowfall, and general humidity being unchanged. R. D. Hall called attention to the fact that the number of deaths and accidents from explosions tended to increase in proportion to the square of the number of men employed, unless new precautions are taken, because explosions occur in proportion to the men employed and the number of men affected by such disasters is apt to be also proportional to that number wherever the explosion is violent.

Strong Stoppings

The following question was then asked:

Are strong stoppings desirable to forefend the dangers of an explosion?

The fact was discussed that a strong stopping serves to limit the area over which an explosion spreads. Expansion being prevented, the violence of the blast becomes confined, and its propagation is then better assured. Where there is room for expansion in every direction, the force of the blast may be so weakened that the area ultimately affected may be limited. However, the disadvantage of weak stoppings is to be found in the fact that after an explosion the direction of the current and its arrangement in separate splits are affected, with the result that several men may be poisoned or suffocated.

John Clifford declared that stoppings could not be made solid enough to resist an explosion. Hence, a discussion such as the present could not be of any value, and Mr. Gay took a similar stand. Such a statement could obviously not be controverted, but, as was pointed out, stoppings can be and have often been made competent to resist explosions at their inception. If they are strong enough for that purpose where the explosion starts, the explosion may get such headway that no stopping can be made strong enough to confront its violence successfully.

Laws on Pure Oil

The next question was:

Should there be a change in the law relating to oil used in the mines of Pennsylvania?

Mr. Scurfield contended that the law should apply not to the mine foreman or miner, but to the merchant who sold oils which he knew were not good and who was endeavoring to make a profit larger than was possible when selling pure oil.

The banquet on the evening of the first day was attended by nearly 200, and was addressed by the toastmaster, H. S. Endsley, John Fulton, C. G. Geer and Frank Gray. Most of the speakers sought rather to entertain their hearers than to contribute anything on the mining situation, but Mr. Endsley made a plea for the new compensation bill which it is proposed to press to passage in the legislature of Pennsylvania. John Fulton gave his most interesting reminiscences and Frank Gray spoke on the spirit of mutual helpfulness manifested by the first-aid workers.

First-aid Contest

The morning of the second day was devoted to a first-aid contest at the base-ball grounds. The organizers of this trial of skill were Thomas B. Dilts, mining secretary, Pennsylvania State Y. M. C. A., and Harvey J. Hill, special secretary, Y. M. C. A., Johnstown, Penn.

The Tunnel Coaling Co. of Gallitzin and the Portage Coal Mining Co. (Team No. 6) tied for first place, both making 97.8 per cent. In a final contest the Tunnel Coaling Co. team proved winner.

The first prize was a silver loving cup presented by the Coal Mining Institute, the second was an engraved copper shield on an oak plaque, presented by the industrial department of the Y. M. C. A. and the Y. M. C. A. of Johnstown. The third prize fell to the Cambria Steel Co.'s team No. 2. It consisted of a first-aid cabinet presented by Johnston & Johnston. The fourth prize fell rightly to the team of the Berwind-White Coal Mining Co., of Winber, but was given to the Vinton Colliery Co. team No. 11, at the request of the former.

The Winber team, despite the fact that it made a good showing, felt aggrieved at the low place accorded it. The statement was made that the prizes were distributed not so much for merit as from a desire to kindle enthusiasm for first-aid work. There is no reason to take this view. The contest was conducted in a manner which was preëminently fair.

How Judgment Was Rendered

In first-aid contests it is customary to give demerits for every error made by the contesting teams. As the marking is not for merits but for faults, a good judge will prove a severe handicap for a team and a poor umpire is much to be desired. However, there can be no bad feeling or regret on this score. The judges were rotated so that each judge watched each team only twice. Thus all the teams had an equal chance.

There were a number of errors made. First aid is still a new study, and lack of discipline, purpose, method and comprehension is still manifest. One first-aid man when rescuing a victim from a live wire deliberately trod on the wire without taking any care to protect himself from the current. One team partly removed the victim from the wire and dressed him while still lying in that painful position. Yet another team laid the man thus burned, on his back, face upward, on the

stretcher. There seemed to be a failure to know which end of the injured man should be forward when he was being carried down hill. "Granny" knots and loose bandages were not infrequent, and there was evidence that more training is needed.

The Cambria Steel Co. was the generous host of the institute at the midday lunch, and in the afternoon provided the train to take the members to the washer, coke ovens, byproduct plant, plate mill, wire mill, and the Hinckston Run dam. En route several other departments were also viewed, the trip being extremely interesting and instructive and the weather propitious. The train returned to Johnstown at 5:30 p.m.

Life of Hoisting Rope

The English Royal Commission on Mines agreed that the maximum life of a hoisting rope should be 3½ years. This represents the average British length of wear. Three wires broken in one strand near together are looked upon as far more dangerous than the same number of wires broken in different strands far apart. When wires are reduced 50 per cent. in cross section, English authorities consider that the rope should be taken off. Instead of specifying a factor of safety for hoisting ropes, they think it better to specify the margin that should be allowed between the breaking strain and the load.

Precautions After Shooting

Where chambers are properly mined and ventilated, the limit charge 1½ lb. of permissible explosive, produces little poisonous gas and no smoke; but do not return to the face after firing a permissible explosive any sooner than when using black powder, for while the air itself shows only the faintest trace of poisonous gases, the cracks formed in the coal always contain large quantities. At least five minutes should elapse before returning to the face after firing a permissible explosive. The practice of applying a light to a crevice giving off gas is a most dangerous habit and should be forbidden.

Song of the Air in the Mine

BY D. G. THOMAS*

(Written for Coal Age)

I was sitting in the entry,
Humming low a fancied song,
While my fevered brow was cooling,
In the air that rushed along,
Through the dreary, darkened chambers
Where the deadly lurking damp
Lingers harmlessly till startled
By the flame on some one's lamp.

The pick, pick, pick of the miners
I heard in the chambers afar,
Like the noise of cracking muskets
When soldiers are at war;
Now and then a sound like cannon
Roared out with a lurid glare,
When a blast, red-tongued, exploded
And rolled on the vibrant air.

Onward—the current moved onward,
Swiftly and coldly it flew
Into the farthest recesses
Still keeping constant and true;
Hurrying past me it murmured
In language careless and free:
"O man, thy life shall be forfeit
If thou for a moment stop me.

"Make room for my wings, O mortal,
Make room for my wings to fly
With breath for the panting toilers
Or they will perish and die;
Stand not in my way for an instant,
Obstruct not my hard-worn path,
Or the gas that I should make harmless
Will flame in its awful wrath.

"When the world was in disorder,
Ere the days and nights began
Changing cycles with each other,
Long before the birth of man,
I was constantly in motion,
Making ready all the earth
For the coming and the welcome
Of humanity's proud birth.

"Then I lived to be man's servant
Both on land and on wave,
Doing wonders at his bidding,
Working like a faithful slave;
Driving clouds across the heavens
When he needed cooling rain;
Then dispelling them that sunshine
Might smile on the earth again.

"Now they take me in the darkness
Where the Devil's imps abound;
There to kill the gas that gathers
Like a stealthy foe around,
Waiting to disclose its presence
When a flaming lamp is near
To ignite it, then to hasten
On its wild and mad career.

"Keep my passageway wide open,
Make me sing as on I go,
Then the gas that I encounter
Meets an unrelenting foe;
I alone can make it harmless,
Make it shudder, break and flee,
And in safety keep the miners
That depend for life on me."

*Mine superintendent, Union Pacific Coal Co., Rock Springs, Wyo.

Who's Who—in Coal Mining

Devoted to Brief Sketches of Prominent Men, Their Work and Ideas

This is the first real chance I have ever had to get back at my good friend Albert, and what a joy it is to avail myself of the opportunity. Fresh from the campus and green as the grass that grew thereon, Albert took me to his bosom and I was permbitted to serve in the exalted position of backsight, painting numbers on the roof in Lehigh Valley mines.

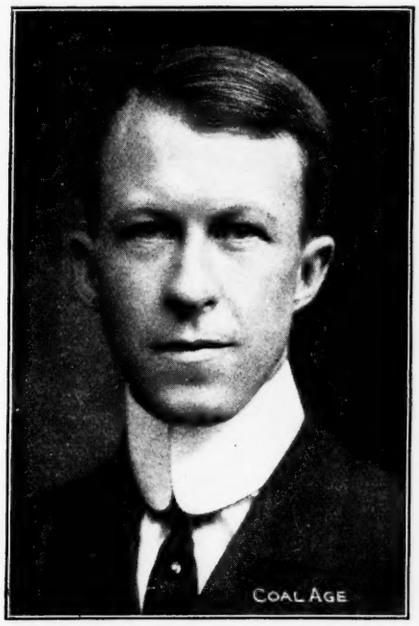
And, months later—how I remember the glorious day—when, through the demise of some good friend, or for other justifiable reason, there was a shift, another advance, and I was at last a real engineer, with the privilege of running a transit in a district all my own. What a spendthrift I was that night, going to the theater and buying the best seat in the house. What did I care for money? I was a regular in the ranks; no longer a volunteer.

But alas! The break came. Albert figured I was worth $3.33 a month less than the personal valuation I placed on my own services. My new dignity as an engineer forbade my acceptance of such injustice, and so I started on the road that finally led to an editor's desk. "A. B." is firm in his belief that the birth of COAL AGE is due solely to his inability to properly figure and confirm the estimated worth of an employee.

But let us waste no more time or ink on reminiscences. When A. B. Jessup is the object of your pen attack, there is no occasion to inject small talk just to fill the allotted space.

He was born in the little village of Springville, Susquehanna County, Penn., 40 years ago. This same hamlet was the birthplace of the late W. A. Lathrop. His mother's father was a country banker and justice of the peace for 50 years. His other grandfather was a judge of the Circuit Court of northeastern Pennsylvania, and wrote a large part of the platform upon which Lincoln was first elected. His father was a banker.

At the age of one year, Mr. Jessup's parents moved to Scranton, and 20 years of Albert's life were spent in that same city, attending private schools and preparing to fulfill his father's hope that he enter Yale and become either a minister or a lawyer, his parents believing that he would choose one of these extremes as a profession. But Latin and Greek were his abhorrence, and all the inclinations of the lad tended toward mathematics and the sciences, so he finally decided to follow in the footsteps of Edison, and threw over the classics for the thorny crown of an electrical engineer.



ALBERT B. JESSUP

Albert entered Lehigh University, South Bethlehem, Penn., passing second out of 250. At this stage of his life, "A. B." was unusually shy, and his modesty was in the nature of a chronic disease. After taking the examinations at Lehigh, he thought he had failed and was surprised to learn that he had successfully passed. He was fond of outdoor sports, but was too shy to avail himself of opportunities to rough it, so that most of his days were spent in reading, averaging a hundred books a year for a long period. He says now that this was a mistake, and believes that a boy should be out of doors and among his mates.

At college he was a hard student, nearly a grind, paying such close attention to his college work that he neglected other duties and pleasures. His father had met with financial reverses, so that young Jessup did not feel as though he could afford to take any chances on not finishing his course with credit. Three years were spent in the electrical-engineering course at Lehigh, and he tried to get a special course in electricity as applied to mining, but this was impossible, for Jessup was a few years ahead of his time, and nobody then knew enough about the subject to give the instruction desired. He therefore took up mining engineering, and by desperate work finished with his class (1895), securing the degree B. S. in mining. The following year he took a post-graduate course and was given the degree Engineer of Mines.

After graduation he found hard times and few jobs vacant, but was offered an appointment with the Bethlehem Steel Co. His long residence in the much under-mined city of Scranton, however, had created in him a hankering for coal mining. Also, one summer's vacation had been spent in the very lucrative position of backsight on a surveying corps of the Lehigh Valley Coal Co., so that it was not long before Albert returned to Wilkes-Barre with his two degrees, and secured his old job again. There wasn't any lower one, so he is justified in his contention that he started at the bottom.

After spending several months carrying dinner buckets, rods, paint pots, hatchets, coats, spades, plumb-bobs, plugs, drills, string, oil, white lead, chalk, etc., besides a few other things which the more exalted members of the corps did not care to be bothered with, Mr. Jessup was advanced step by step in the engineering department of the Lehigh Valley Coal Co. until he was sent to Centralia, Columbia County, Penn., to organize an engineering department for the new division, formed by the purchase of individual collieries by the Lehigh Valley people.

Mr. Jessup says that Charles M. Schwab, now president of the Bethlehem Steel Company, owes his high position to the fact that he (Jessup) went into coal mining instead of remaining in the steel business. There is more truth than poetry in this little jest of his, however, for if hard conscientious work, combined with mental ability, will get a fellow to the top, and some philosophers say they will, then A. B. Jessup is likely to grab the top rung of any ladder he attempts to climb. While "Excelsior" is his motto, there is no desire or design on his part to go up at the expense of any fellow worker. He believes in a square deal, a fair field and no favors. Systematic squelching of promising subordinates for fear of their becoming rivals to their superiors, is abhorrent to him.

While at Centralia, the late Robt. S. Mercur was his boss, and Albert pays tribute to him by saying: "A better and fairer coal superintendent never lived." Jessup's assets when he assumed the rôle of division engineer in Columbia County were, two degrees, two suits of clothes, one pair of boots and a quantity of brains. The boots, however, were

nearly new. He remained at Centralia five years, absorbed mining experience under the most favorable conditions, being right on the job and situated in a locality where there were but few distractions.

It was in Centralia that the mine-cave conditions first arose in relation to surface improvements, and the case creating Pennsylvania law on the subject was made in a suit involving mine development in that locality. The court held that the terms of a surface-owner's deed governed the situation, no matter how hard the terms were. Living in the midst of people whose homes, representing their life's savings, were in danger of destruction by mining operations, and legally at that, brought the subject home to Mr. Jessup in the strongest possible way. He has always made the problem of surface protection a special study, and is probably the best posted man in the country on this subject.

From Centralia he was promoted in 1901 to be assistant mechanical engineer for the whole Lehigh Valley Coal Co., with headquarters at Wilkes-Barre. A little later, he became division engineer of the Wyoming and Lackawanna divisions. In 1905 upon the acquisition of Coxe Bros. & Company's mines, he became mining engineer for the Lehigh Valley Co., Coxe Bros. & Co. and the affiliated mining corporations. At this time the companies produced about 11,000,000 tons of bituminous and anthracite coal annually, ranking second among the coal companies in tonnage, but first of all in results, due largely to W. A. Lathrop and his successor S. D. Warriner, who built up an organization surpassed by none.

This position with the Lehigh Valley Coal Co. held Mr. Jessup until May 15, 1912, when he became general manager of the G. B. Markle Coal Co. and the Jeddo Tunnel Co. The former corporation produces annually about a million and a quarter tons of a grade of anthracite coal which is acknowledged the highest in quality of any on the market. The company also owns the Jeddo Tunnel, the famous drainage proposition, five miles in length, which was conceived and built by John Markle, the gifted president of the company. The construction of this tunnel is a great credit to his genius, as it drains not only the Markle mines, but other operations in the same district. It works 24 hours a day, does not strike, gets no advances in wages, and never sends a committee to demand its rights. We congratulate Mr. Jessup on being general manager of a high-class tunnel. It must be one of the most desirable jobs in the anthracite field.

One of the best things Albert Jessup does is to act in the capacity of an expert witness for some company that is engaged in a legal wrangle. His guileless, innocent and youthful countenance serves him well when testifying in mining litigation. He answers all questions directly, clearly and honestly, and his success is due to the fact that these three qualifications are so unusual in an expert that they mislead the opposite side.

He has always taken an interest in the U. S. Bureau of Mines and was offered a good position in that department of our government when the technologic branch was first formed. In 1911 he was a member of a party of experts who visited European mines under the auspices of our Federal Mining Bureau. He has always been an ardent advocate of sand flushing for the recovery of coal-mine pillars under water-bearing surface and improvements. It is probable that he is the originator of the idea of dredging and hydraulicking sand from river deposits into the mines.

In recent years Mr. Jessup has won considerable renown as an after-dinner speaker, and when questioned concerning his oratorical attainments, said that any success he had achieved as an impromptu speaker had been won only after the hardest kind of work. His first attempt was such a miserable flunk that he determined to surmount the difficulties which confronted him. He says: "Desmosthenes never tackled a bigger job than I did in the speaking line. He was tongue-tied—so was I, but brain-tied also."

In college A. B. Jessup was a member of the Psi Upsilon, Triskaideka and Tau Beta Pi Societies. While located at Wilkes-Barre he was an active member of the Scranton Engineers Club, and later became the first president of this same organization when its name was changed to "The Engineers Society of Northeastern Pennsylvania." He is also a member of the A. I. M. E., but is not a "joiner" unless he expects to take a real active part in the proceedings of any society with which he becomes affiliated.

Difficulty with an Electric Coal Cutter

SPECIAL CORRESPONDENCE

In spite of the suspicion and even antagonism with which miners appear to have regarded the introduction of electricity into the mines, the developments which have taken place in this direction have been most remarkable, and it is probable that even the small percentage of accidents which have occurred during recent years in connection with electrical machinery would have been still further reduced if the men in charge of the plant had been a little more skillful and better informed.

Especially in the case of portable machinery, such as coal cutters, is misuse particularly noticeable, even though such ill treatment may be entirely unconscious on the part of the operator. Some of the troubles which affect coal cutters are obscure in their origin and in many cases are due to ill treatment arising from the fact that the operators are not electricians, and do not understand what happens to the machine under exceptional circumstances.

For example, in the case of a coal cutter working on a face about 120 yd. long and cutting up to a fault where the coal disappeared, the operation was as follows: Each time the machine cut out, the haulage rope was reversed and the motors were used to pull the machine back to the gate, in order to start the cut again, the cutter wheel being disconnected and the motors run two in series on a 250-volt supply. At times when the machine was hauling itself back to start the cut afresh, fuse after fuse was blown out and reports were handed in to the effect that a considerable amount of sparking was seen inside the motor casing.

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Prospective profits so much larger than those usually earned by coal-mining enterprises would, however, doubtless quickly bring about the opening of many mines, with such increase in production and competition as to destroy the possibility of profitable operation.

No coal has yet been found or developed in Michigan which is comparable in thickness, quality, mining conditions, etc. to average Ohio coal, and thus the Michigan coals intrinsically are not worth as much per ton as the average product of the Ohio beds. Yet in many cases there remains a satisfactory margin of possible profit between the cost of mining in this field and the delivered cost of other competitive coals. Unfortunately, however, the Michigan output has been in excess of the local demand for coal of this grade, and competition among Michigan operators has often reduced the average selling prices to less than the cost of mining.

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Within the last five years the output of the Michigan mines increased more rapidly than the local demand, and the competition among producers resulted in small and unsatisfactory profits to some, and disastrous losses to others; but these facts do not in themselves justify the conclusion that Michigan coal lands are less valuable than those in other districts. Recently the situation has been changed by the exhaustion of some mines and by the permanent or temporary closing of others.

From my study of the situation, it seems patent that the Michigan mines will soon earn profits commensurate with those earned in other districts. If this be true, then coal of workable thickness and marketable quality should be as valuable acre for acre, or ton for ton, in Michigan as in any other district.

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In conducting this investigation it has been found that in many cases the estimated life of any property, that is the term during which it can be expected to continue in operation, is involved in more or less uncertainty, unless the property has been thoroughly drilled. The value of the mining plant and improvements, (the hoisting engine, fans, boilers, tipple, tracks, shafts, entries, etc.) depends, not upon their first cost, present condition or value as second-hand material or junk, but upon the tonnage of coal which the plant will raise to the surface. After it has performed this work, its value as second-hand material or junk is relatively small.

Hence, a logical method of reaching the value of such mining property is to determine the value of the developed and proven coal tonnage, for this represents the whole profit, and, therefore, very nearly the whole value of the property, including the present value or first cost of the plant and improvements; for when this coal is all extracted the property is exhausted, and the plant and improvements may be worth a small fractional part of their first cost.

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nearly new. He remained at Centralia five years, absorbed mining experience under the most favorable conditions, being right on the job and situated in a locality where there were but few distractions.

It was in Centralia that the mine-cave conditions first arose in relation to surface improvements, and the case creating Pennsylvania law on the subject was made in a suit involving mine development in that locality. The court held that the terms of a surface-owner's deed governed the situation, no matter how hard the terms were. Living in the midst of a people whose homes, representing their life's savings, were in danger of destruction by mining operations, and legally at that, brought the subject home to Mr. Jessup in the strongest possible way. He has always made the problem of surface protection a special study, and is probably the best posted man in the country on this subject.

From Centralia he was promoted in 1901 to be assistant mechanical engineer for the whole Lehigh Valley Coal Co., with headquarters at Wilkes-Barre. A little later, he became division engineer of the Wyoming and Lackawanna divisions. In 1905 upon the acquisition of Coxe Bros. & Company's mines, he became mining engineer for the Lehigh Valley Co., Coxe Bros. & Co. and the affiliated mining corporations. At this time the companies produced about 11,000,000 tons of bituminous and anthracite coal annually, ranking second among the coal companies in tonnage, but first of all in results, due largely to W. A. Lathrop and his successor S. D. Warriner, who built up an organization surpassed by none.

This position with the Lehigh Valley Coal Co. held Mr. Jessup until May 15, 1912, when he became general manager of the G. B. Markle Coal Co. and the Jeddo Tunnel Co. The former corporation produces annually about a million and a quarter tons of a grade of anthracite coal which is acknowledged the highest in quality of any on the market. The company also owns the Jeddo Tunnel, the famous drainage proposition, five miles in length, which was conceived and built by John Markle, the gifted president of the company. The construction of this tunnel is a great credit to his genius, as it drains not only the Markle mines, but other operations in the same district. It works 24 hours a day, does not strike, gets no advances in wages, and never sends a committee to demand its rights. We congratulate Mr. Jessup on being general manager of a high-class tunnel. It must be one of the most desirable jobs in the anthracite field.

One of the best things Albert Jessup does is to act in the capacity of an expert witness for some company that is engaged in a legal wrangle. His guileless, innocent and youthful countenance serves him well when testifying in mining litigation. He answers all questions directly, clearly and honestly, and his success is due to the fact that these three qualifications are so unusual in an expert that they mislead the opposite side.

He has always taken an interest in the U. S. Bureau of Mines and was offered a good position in that department of our government when the technologic branch was first formed. In 1911 he was a member of a party of experts who visited European mines under the auspices of our Federal Mining Bureau. He has always been an ardent advocate of sand flushing for the recovery of coal-mine pillars under water-bearing surface and improvements. It is probable that he is the originator of the idea of dredging and hydraulicking sand from river deposits into the mines.

In recent years Mr. Jessup has won considerable renown as an after-dinner speaker, and when questioned concerning his oratorical attainments, said that any success he had achieved as an impromptu speaker had been won only after the hardest kind of work. His first attempt was such a miserable flunk that he determined to surmount the difficulties which confronted him. He says: "Desmosthenes never tackled a bigger job than I did in the speaking line. He was tongue-tied—so was I, but brain-tied also."

In college A. B. Jessup was a member of the Psi Upsilon, Triskaideka and Tau Beta Pi Societies. While located at Wilkes-Barre he was an active member of the Scranton Engineers Club, and later became the first president of this same organization when its name was changed to "The Engineers Society of Northeastern Pennsylvania." He is also a member of the A. I. M. E., but is not a "joiner" unless he expects to take a real active part in the proceedings of any society with which he becomes affiliated.

Difficulty with an Electric Coal Cutter

SPECIAL CORRESPONDENCE

In spite of the suspicion and even antagonism with which miners appear to have regarded the introduction of electricity into the mines, the developments which have taken place in this direction have been most remarkable, and it is probable that even the small percentage of accidents which have occurred during recent years in connection with electrical machinery would have been still further reduced if the men in charge of the plant had been a little more skillful and better informed.

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Michigan coal field it becomes necessary to make a further deduction by cutting the above value in half, thus bringing the value of undeveloped territory down to about one-quarter of the base value, or upon the above assumption to 2½c. per ton.

Present Values

To determine the present money value these base values must be discounted for the term of years elapsing before mining is begun and for the term necessary to exhaust the property. Assuming that existing and projected operations will be able to supply the market requirements for the next ten years, and that the average life of collieries hereafter opened will be an even decade, then the present money value of a ton of coal in undeveloped territory (2½c. discounted at 5 per cent. interest for a term of ten years, and distributed through a further ten years) may be taken at about 1¼c. per ton, equivalent, for a coal bed 3 ft. thick and estimated to yield 3000 tons per acre, to a value of $37.50 per acre.

In cases in which undeveloped lands are opened and worked in a shorter period than ten years, the discount period is correspondingly shorter, and the present value upon this basis may be 1½, 1¾ or 2c. per ton, and the value will also be increased where the thickness of the coal, its quality or the mining conditions justify such increase.

Area of Coal Field

What is known as the Michigan coal field has been shown by the maps and report of the Geological Survey to include an area of 15,000 square miles, including all of 13 and portions of 14 counties. That is, the formations which contain coal underlie in whole or in part the surface of these 27 counties. The presence of coal has been demonstrated in these formations at hundreds (or thousands) of places by bore holes drilled for water or for salt, and by wells dug for water, and in some localities by many holes drilled for the purpose of learning the thickness and quality of the coal.

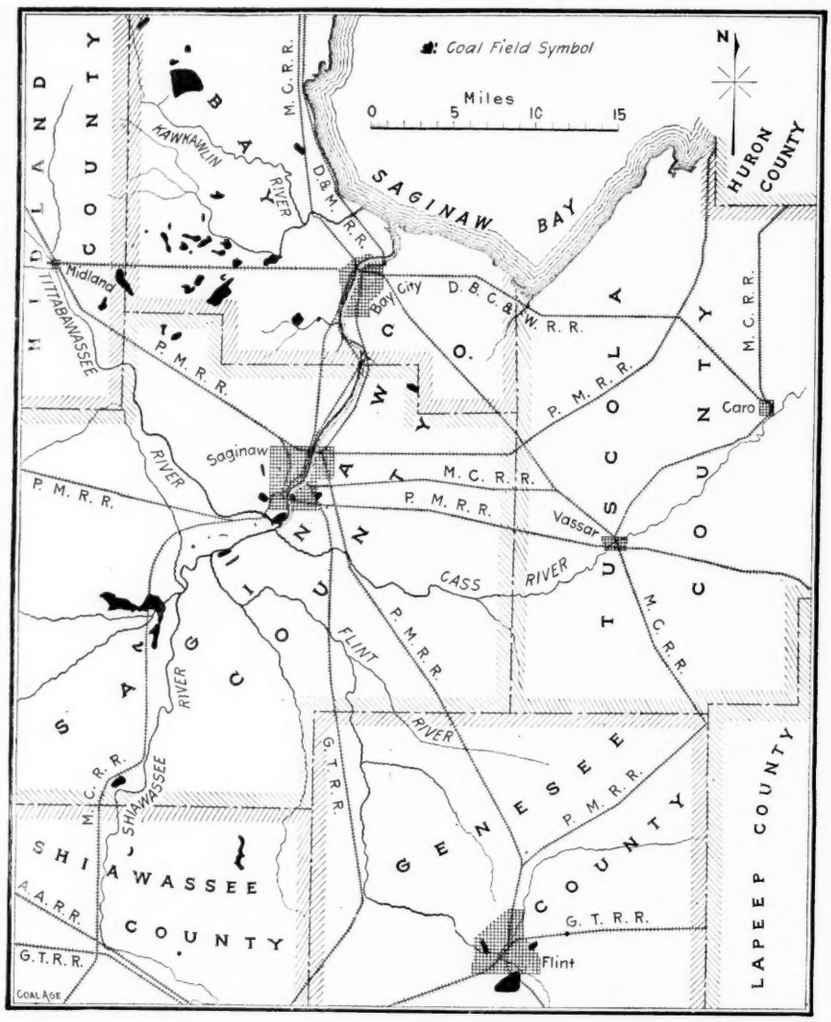
The information obtained in this way at many localities appeared to justify the sinking of shafts and the mining of coal. Thus mines have been opened and worked in nine counties. Some of these enterprises were unsuccessful from the outset, and many others were abandoned.

MICHIGAN MINING COUNTIES.

County	Mines
Bay	10
Saginaw	17
Tuscola	1
Genesee	1
Shiawassee	2
Ingham	1
Eaton	2
Total	34

Peculiarities of Michigan Field

In most of the coal fields of the United States, the workable beds of coal are regular and persistent in thickness and quality over large areas. When this condition is known in any district coal lands become valuable for their coal contents, and the mining, mineral or coal rights become marketable, not only to coal operators and those engaged in the coal business, but also to investors who do not expect an immediate return on their investment.



THE MICHIGAN COAL DEPOSITS

In such districts and under such conditions the present money value of the coal, distinct and apart from the value of the land, may readily be determined by the price at which it can be sold. In the Michigan coal field, so far as is now known, the workable coal is confined to irregular areas of small size, and these areas in the aggregate comprise a relatively small portion of the whole coal field.

Workable Thickness

Under present mining and economic conditions in Michigan there is no possibility of working coal beds profitably, when the average thickness is less than 30 in. Any coal bed of less thickness can be unhesitatingly classed as not workable. The time will doubtless come when coal of such thickness can be mined, but this contingency is remote and uncertain and is insufficient to add any measurable present value to lands containing such coal.

The same statement is broadly true of lands containing coal less than 3 ft. thick, for except in rare instances this is the present economic limit. When working coal beds more than 3 ft. in thickness, it is often possible to extend the mine workings into marginal areas (contiguous to the thicker coal), and in which the thickness may shrink to less than 3 ft., providing that the roof is good and the coal of good quality, and other conditions are favorable to cheap mining. Under these circumstances, such workings may extend to and include marginal areas in which the coal shrinks to 30 inches.

(To be continued next week)

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This journal is interested solely in matters relating to the fuel industries, and is designed to be a medium for the free interchange of ideas, the detailed description of coal-mining practice, and the expression of independent thought calculated to benefit both operator and miner.

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COAL AGE

Popular Judgment

Our views on ascribing blame and imposing liability have taken a new turn in the last 20 years. In earlier days we were prone largely to consider that the injured were subjects for ridicule rather than commiseration and indemnity. When a man mounted a mustang and was thrown and broke a few ribs, the whole camp broke into convulsions of laughter, and it was great sport to slip a thorny cactus under the saddle so as to provide for the unhorsing of an undesired cow puncher, who was not more handy with his gun than he was with his mount.

In our childhood we delighted in that recondite study into remote relationships known as "The House that Jack Built." Far-reaching as is its reference, it is scarcely less unique than the reasoning by which we make the employer to blame for all the ills the employee is heir to or may suffer.

Thus we say the employer should not have hired a man who would be criminal enough to place a cactus under the saddle of the cow puncher who was injured. We begin to see that the ranch owner is the biggest felon of them all. Because the sport who inserted the cactus is an employee of such a monster, he is to be pitied. He is engaged in an enterprise involving a large percentage of men in death and accident. He himself is liable to be the victim of such a misfortune. In fact, it is an unkind fate which compels such a jolly good fellow to work for such a heartless creature.

Our viewpoint is changing. Everywhere we are faced by signs and guarded by notices, urging us to use the most elementary precautions. We have commended our lives to the transportation and industrial corporations, and we demand that we be protected against carelessness, ignorance and suicide. If, for the common advantage, industrial concerns are to be held to a liability for all the silly acts of irresponsible employees, it certainly behooves all workingmen to second the efforts of the companies by doing all in their power to reduce the dangers of travel and of work.

Mr. Chance's Dime

We publish today an article by H. M. Chance on the value of the Michigan coal deposits, an article of much interest and containing no little information and accompanied by some sound scientific deductions. But we hesitate, nevertheless, to regard his report as scientific, because the major premise, that on which his appraisal deductions all rest, is based on intuition or a guess and not on reason. In the scheme of creation, in the order of things sociologic, is there any material basis for Mr. Chance's expressed belief that coal *in situ* and ready to be developed is worth just one dime a ton?

We have often been amazed at the follies and presumptions of the average accountant who assumes without inquiry that property is worth whatever has been paid for it. He will credit a concern, which has purchased a "gold brick" with an asset dependent, not on the brick as clay, nor yet on the brick as gold, but on the valuation at which that individual piece of property was sold without regard to the market prices ruling at the day of appraisal.

But while we think that position is ridiculous, we do not find that the new scheme of evaluation elaborated by H. M. Chance for the tax assessors of Michigan is one whit more reasonable or more worthy of adoption. It results in no particular injustice, however, because in reality the author of the article only seized on the dime because he felt he could make that coin serve the conditions as he found they actually were when applying a test of a more scientific character to the Michigan conditions. The fact that he thus checked his results is barely indicated in the article and it is certain that he would not have remained content with his conclusions had they not tallied fairly well with that investigation regarding which he is more silent.

We shall do well to avoid evaluations based on intuitions or on an alleged national consensus of opinion, and if supply and demand are not artificially controlled by monopoly, will do well to

base our conclusions, openly and not indirectly on the records of prices paid at actual sales. In the Michigan field, there is no such control and the value of the coal field can be safely determined from the hagglings of buyer and seller in the open market.

With such sources of information before him, why did Mr. Chance hit on such a happy-go-lucky method of valuation? The royalties of the Michigan fields and the selling price of coal lands per acre, are they not matters of record at every county courthouse in the coal-mining districts of the state?

Why guess or assume? Why generalize from conditions in other states, especially in view of the fact that these conditions are far from uniform? We know of certain regions, sadly ill-favored it is true, where coal is not sold at a royalty of a dime a ton but rather nearer that equally popular price, "two-for-five."

If Mr. Chase had desired to be scientific, as scientific in the premise as he endeavored to be in his deductions, he should have tackled the Ricardo theory of land values and rent. That theory it is true has been assailed as being too scientific to represent the actual sale prices and rentages of lands, but it is not so easily controverted when it is considered as a means of discovering, not the real sale price or the reason for such a price, but the real value of the property in question.

Ricardo would have had our investigator ascertain what coal entering the market was thinnest in natural bed and most undesirable to extract and to sell. Then he would have urged him to compare the cost of production of the mining properties which he sought to evaluate with that of those unfortunate properties, having in mind the selling price of the respective products. The basal property with the thinnest and least profitable coal, Ricardo would regard as valueless. The other properties could be evaluated as worth the present-day equivalent of the future profit which could be drawn from the field.

This would be a difficult matter to determine and possibly in a degree unreliable, but it is a conceivable method based on a scientific principle and therefore more reasonable than an adherence to a certain unit value, favored solely because Congress in its wisdom chose to coin a ten-cent and failed to coin a fifteen-cent piece. In fact we believe that it would have been more scientific, if less dignified, to have made a diligent search of court records and based the report on them. Unfortunately the dignity of the consulting engineer too often requires him to refrain from asking those very questions and pursuing those very inquiries which would give his report its greatest value.

However we must concede that Mr. Chance has not given any of those grotesque valuations for coal lands which seem to have the approval of the President, Senate and House of Representatives. The interest of the people lies in low prices for fuel. If the purchasers have to pay high prices to secure it, and large interest and tax charges to hold it, then the cost of coal to the consumer will be high. If the coal lands are sold cheaply, then the small operator has an opportunity and his output prevents the narrowing of the competitive field.

It is true that a very low price for coal lands enables a large corporation to buy up all that is desirable, or all that fronts on a small field, but it would be better to penalize every attempt to work an injustice on the consumer than to put a fancy price on his fuel. There is no greater evil today than the excess we have to pay the holders and exploiters of lands. And now we learn that the government has joined the exploiters and even leads the way in making unreasonable charges for coal properties. The call for sanity in appraising coal lands is loud, and Mr. Chance's point that internal competition overcomes the gains which would otherwise be made, owing to favoring freight rates, has been many times demonstrated and should not be overlooked.

Prices of Mining Supplies

With this issue of COAL AGE is incorporated a new department, "Prices of Mining Supplies." This will, in the future, be published in the first issue of each month.

To lower the cost of production is the problem confronting men engaged in all lines of industry, but perhaps this is of greater importance in coal mining than in any other line of activity. The profits in any mining venture are in a direct ratio to the efficiency in operation, and the problem of showing a profit instead of a loss is steadily becoming more difficult.

Eliminating the cost of labor, the next principal item of expense at coal mines is the cost of equipment, and material for maintaining same. If this material has not been bought at the lowest possible price, there is a waste. Thus, to insure economy in operation, any money expended in this direction must be so placed as to insure the maximum service from the material purchased. In view of this fact, we believe that a monthly review of market conditions and the prices of commodities will be of value to mine operators.

This report is different from others of a like nature, in that it is written from the standpoint of the buyer rather than the seller. To this end the report goes into rather minute details, describing the quantities on which prices are made, the point of shipment and the size of lots that will be sold at these quotations. Frequently the lots as quoted here are larger than the operator would wish to purchase, but nevertheless the price will form a reliable guide.

Our Loss Is the Gain of Another

To our great regret we announce that M. A. Walker, one of the associate editors, has severed his connection with COAL AGE. He was one of the hands who first launched the boat from the ways in October last, and though he did not often contribute signed articles, much of the success of the paper can be attributed to his good judgment and ardent zeal.

Mr. Walker was a graduate of Lehigh University, and spent some time as a member of the United States Reclamation Service. He had experience for some years as a mechanical engineer with the Lehigh Valley Coal Co. and the Lehigh Coal & Navigation Co. He has now entered the contracting engineering profession with Fairbanks, Morse & Co., at Chicago, Ill., and he will design and erect coal plants as in his earlier years.

We congratulate Mr. Walker on his bright prospects and shall ever regret that his talents and pleasant companionship are denied us, but we feel pleased that his undoubted abilities have been fitly recognized by those with whom in the future he will associate.

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

Flame Caps and Firedamp Mixtures

I have often heard different mining men say that they have found large bodies of firedamp mixtures (pure marsh gas and air), in the mines; and that these mixtures would give gas caps in the ordinary Davy safety lamp, the caps ranging from 1½ in. to 3 in. in height; and further stating that these mixtures would neither explode or burn when an open light was exposed to them.

They have explained that it was a case of "gas needing air," meaning by this that there was not sufficient air mixed with the gas to render it explosive or inflammable. While there may be no doubt that this is true, and the gas did need air to render the mixture explosive or inflammable, it seems to me to be misleading to state this fact in such a way. If the firedamp mixture referred to was pure marsh gas and air, but there was not sufficient air to make the mixture explosive, these men must have traveled through a highly explosive mixture of firedamp before they could have reached the place. On this account, I incline to think the gas they found was not pure marsh gas, but a mixture of marsh gas, air, nitrogen and carbon dioxide, with, perhaps, small amounts of other gases.

In my experience, I have known several instances where such mixtures have been found in the old abandoned workings of mines; and, in one case, I remember it was difficult to keep a light burning, although you could still observe a small gas cap above the flame of the lamp. Such mixtures are liable to exist in any poorly ventilated part of a mine; and are caused by the slow diffusion of the different gases into the mine atmosphere, which is kept slightly disturbed by the frequently varying pressures at the entrances to these abandoned places. Where the mine atmosphere is still and not subject to such disturbances, the law of gravitation would cause the lighter gases to stratify near the roof and the heavier gases near the floor of the mine. Such a condition greatly assists the detection of the several gases, because they are separate; but when these gases are mixed, as previously explained, it is impossible for anyone to determine exactly the true character of the mixture, by the use of a safety lamp, since the gases each have different effects on the flame of the lamp. Small amounts of carbon dioxide gas, in mixtures of marsh gas and air tend to reduce the height of the flame cap; and small amounts of carbon monoxide gas increase the height of the flame cap. A full knowledge of these effects and much practical experience in testing for gas are required in order to determine, even aproximately, the probable mixture of gases.

It was the custom in one of our mines for the chemist to come once each week to take samples of the mine air, in different parts of the mine, for the purpose of testing, in the laboratory, the gaseous condition of the air. I think this would be a good idea if the height of the flame cap were studied at the same time.

BENJAMIN HARTILL.

Johnstown, Penn.

Drawing Room Pillars

Referring to the question of drawing room pillars, which was answered on p. 981, COAL AGE, May 4, and discussed by Pennsylvania Fireboss on p. 1086, COAL AGE, May 25, I beg leave to offer the following, which I have learned from practical experience in drawing pillars under nearly all conditions in mines.

The question is, "Which side of the room should be widened out?" It is a difficult matter to lay down any safe, fixed rule for the widening out of rooms, in a coal mine. The safest and most natural plan is to follow the practice found by experience to be the best suited to the conditions in that particular mine. A progressive, go-ahead mining man will always make changes where there is anything to be gained thereby; but the average mining man will generally get the best results by following the methods practiced in his particular locality.

Some mining men say, "Always widen rooms inby"; but that would not be the proper thing to do under every and all conditions. For example, we will assume there is a butt heading driven to the boundary. The heading rises, say 2 per cent. and the coal seam is making some water. The coal is 4 ft. thick with 6 in. of "boney." Rooms are being turned at the upper end of the entry and are numbered from that end outby, or in a direction directly opposite to the common practice of numbering the rooms. In this case, we would widen the rooms outby. As soon as No. 1 room, at the head of the entry, was driven up, we would pull the tracking and some of the timber; but there would be no pillar to draw back in this room. We would begin to draw back pillar, No. 2, between rooms 1 and 2, as soon as No. 2 room is driven up to the limit. When No. 3 room has reached the limit we would begin to draw back the pillar between rooms 2 and 3, and so on in order as the rooms are finished.

In the case we have assumed, the water would drain naturally from the working face to the entry, which would be quite an advantage to the loader; and as there is 6 in. of bone that must be thrown into the gob, it would be well to widen out on the proper side so as to avoid any extra expense by having to shovel away the gob to get at the pillar.

On the other hand, if this same heading was driven to the dip, say, a 2-per cent. dip, other conditions being the same, we would widen the rooms inby, and begin at the lower end of the entry. By doing this the same advantages in cheap extraction of the pillars would be gained, as before, by keeping the working face well drained and the grade in favor of the loaded cars. It is clear, therefore, that the widening of rooms depends on the conditions existing in the mine.

JOSEPH NORTHOVER.

Seanor, Penn.

Humidity of Mine Air

The subject of the humidity of mine air is of so much interest to me I am minded to offer a few remarks on the excellent paper prepared by Mr. Karl F. Schoew and read before the West Virginia Coal Mining Institute. I have read this paper, as published in COAL AGE, June 15, p. 1177. Under the paragraph entitled, "Temperature and Moisture," Mr. Schoew says, "Air entering live working places and gobs should by all means be adjusted to natural mine temperature, which, in our state, is about 57 deg. to 60 deg. F., and should contain a minimum percentage of 94 per cent. humidity."

This means that, in the author's opinion, mine air should contain when saturated at the temperature given, 5.2 to 5.8 grains of water vapor per cu.ft. This weight of water per cu.ft. would not harm any miner, even though the temperature ran up to 90 deg. F. Mr.

Schoew, however, goes on to say that, "Overheated air currents in mines, if saturated with moisture, reduce the powers of mind and body." In his concluding paragraph he says, "Properly adjusted mine air, although fully saturated with moisture, has no injurious effect upon miners."

I would like to ask Mr. Schoew to make this point clear. Does he consider 5.8 grains of water per cu.ft. sufficient for mine air having a temperature of 90 deg. F.; because, if so, 40 per cent. of humidity would be sufficient, at this temperature, instead of 94 per cent., as previously stated. As an absorbent of carbon dioxide (CO_2), saturated air at a temperature of 90 deg. F. would be better, as it would then contain 14.8 grains of water per cu.ft. I would like to hear, also, what Mr. Haas has to say on this subject.

JAMES ASHWORTH.

Vancouver, B. C., Canada.

Booster and Tandem Fans

Letter No. 12—Referring to the question of installing a booster fan to assist the main fan, suggested in your foreword of May 25, permit me to say that I consider a booster fan of advantage when the air travel is very long and when the air courses are of insufficient size to keep down the water gage. Where a booster fan is properly installed in the mine I can think of no disadvantage in its use. When air must travel a long distance to reach the working face and the stoppings are leaking air, a booster fan erected in the return, at a point not far from the working face, will enable the men to work when otherwise they would not be able to do so on account of the slack ventilation at the face.

Friction increases with the length of the airways and when the sectional area of the air passages is contracted the quantity of air is much decreased, unless it is possible to increase the speed of the fan. If, however, the fan is already running at full speed, I consider it a good suggestion to place a booster fan at some convenient point in the main return airway so as to assist the main fan in ventilating the mine. I think a booster fan is a great help where the air current in any part of the mine has become feeble or where the main fan has not power sufficient to drive the air to the working face, either because of the increased friction of the airways, or on account of bad stoppings.

Anglin, Ky. NOAH BURTON.

Letter No. 13—Discussing the booster-fan problem, I would say that I believe there are two conditions where the booster fan may be used to advantage. (1) Through the extension of entries a point may finally be reached where, owing to the length of the air courses, the velocity of the air will be more or less completely overcome by the friction of the airways. The air would then cease to flow. (2) Badly constructed stoppings may allow so great a leakage of air as to render distant headings or districts of the mine unworkable, because they have no air.

In regard to the first condition, if the main fan is blowing, I consider an exhaust fan erected at the outlet, or mouth of the return airway, would greatly assist the ventilation of the mine. This method of overcoming the trouble means a smaller outlay than would be required to install a larger or more powerful ventilator than the one in use at the intake.

In regard to the second condition, a booster fan installed at a distant point in the mine will generally render the mine workable. However, a more efficient remedy to apply would be to repair the leaking stoppings and thereby avoid the increase of the fixed charges due to the second fan installation. The booster fan is only a temporary cure for an existing evil and cannot be considered in any other light.

JAMES PRENDERGAST,
Supt. Mine No. 3.
The Pittsburgh-Belmont Coal Co.,
Lafferty, Ohio.

Letter No. 14—I hope I am not too late to add a word in the discussion of "booster" fans. I want to say a booster fan is often of great service in assisting the ventilation of the mine, in working a seam of low coal. For example, in working a 3-ft. seam of coal the entries are driven 10 ft. wide, making the sectional area $10 \times 3 = 30$ sq.ft. Where the mine is well developed the friction is great; and the many stoppings, overcasts and doors cause a large loss of air.

I have found by experience that a booster fan, properly installed at the right place in the mine, is a great help to the ventilation. I believe the same advantage would be found in working a 5-ft. seam of coal where the entries are driven 8 ft. wide, making the area of the airways $8 \times 5 = 40$ sq.ft. However, for the same sectional area of the airway, the rubbing surface and the friction increase as the thickness of the seam decreases. In other words, the friction, in working a low seam of coal, is greater, for the same area, than in working a higher seam.

One argument will always be advanced against using a fan inside the mine; namely, if an explosion should occur it would wreck the fan in the mine. Of course, in that case, the outside fan must do all the work. I think, however, the booster fan is right, in its place.

Banner, Va. A. T. WADE.

A Mine Explosion Due to Lightning

On June 17, at about 4 p.m., a fatal explosion occurred at a mine near Mineral, Va., killing one man and seriously injuring another. The explosion presents some novel features since it has been attributed to a heavy electrical storm, which occurred at about that time.

The mine is a double-compartment slope down to the 1060-ft. level, and from there to the bottom, which is 1200 ft. from the surface, it is a single compartment. Compressed air is used extensively for running the underground pumps.

The pipes leading from the air receiver to the top of the shaft are exposed for a distance of about 60 ft. For the first 400 ft. down the slope the line is of 4-in. pipe; it is then increased to 6 in. to the 800-ft. level, there being a large globe valve in this portion. At the 800-ft. level there is another large globe valve and throughout the entire line there are 13 cast-iron T's and four L's, all being covered with two or three coats of coal tar. From the 1060-ft. level to the bottom, the pipe line is reduced down to 2 in. Below the 1060-ft. level, there is no ventilation except that obtained from the machines when mining.

The mine is a sulphur mine, the product being in the form of iron pyrites. It is used for the manufacture of sulphuric acid and the mine runs day and night, working about 300 men, more or less. It is a double-compartment slope, as noted above, the pitch being about 58.6 degrees.

At the time of the accident there were two men working about 500 ft. from the bottom of the shaft on the 1200-ft. level. These men were loading and charging some shots at this point when they suddenly went off, killing one and seriously injuring the other, as before noted. The electric wires for firing run along the 2-in. pipe line in the shaft for a distance of about 300 ft., and it is believed by some that the lightning, following the pipe line down the shaft, jumped to the wires and caused the shot to be discharged prematurely.

It appears that the shots were ready for firing, as the men had already once attempted to put them off. When the accident occurred they had gone back to inspect the charges and see the reason they had not fired.

I do not believe it possible for lightning to run so far as this, over pipes protected as these were, and I would like to have the opinion of other mining men on this subject.

SAMSON SMITH.

Mineral, Louisa County, Va.

[From the above account as given by our correspondent, it would seem possible that this is a case of hangfire.—Editor.]

Colliery Notes and Comments

Practical hints gathered here and there, and condensed to suit the busy reader

Any man can learn something about coal mining by study and practice, but it is those born with the particular knack or gumption needed that become real experts soonest and count for most in the industry. In other words, the best coal men, like the best poets, are born for it.

Experiments have shown that unless there is an unusually large amount of dust in suspension in the air, ignition does not take place from a naked flame. Dust explosions are the result of violent compressions simultaneously with the production of a large flaming area by the explosion of a charge.

Conservation is the order of the day, and some of the coal-consuming plants now utilize the byproducts of smoke. The flue dust is collected for briquetting purposes; heat units found in the chimney are transferred to warming chambers for preheating boiler water. Sulphurous acid is recovered and chemically treated.

The safety of electric haulageways may be greatly increased by the use of automatic electric signal lights. Where this system is used a red light is placed beside the regulation mine light, and when a motor reaches a block the red light is automatically lighted as a sign that a car is running on that block.

Carbon monoxide is formed by some explosives and it may also be produced by the action of the heat of the blast on the coal in which the shot hole has been drilled. Therefore, as the gas is poisonous and explosive, the miner should avoid breathing the waste gas from a shot or placing a naked light near the crevice gases.

The Baum wash plant, now under construction for the Dominion Coal Company, by the Simon-Carves Company, will be in operation next Spring. This type of washer is largely adopted in Europe, but the one at Sydney will be the first on this side the Atlantic. It will have a capacity of 120 tons of washed product per hour.

The West Virginia Department of Mines now requires all miners to take axes with them into the mines to aid in timbering. Also props must be set as near the working faces as possible, as statistics of the state have shown that a large proportion of fatal accidents due to falls, have occurred while the coal was being loaded out.

When an ordinary safety lamp is used, carbon monoxide and methane both show a cap provided that 2 per cent. of either gas is present. But such a body of monoxide of carbon would result in immediate death from poisoning, whereas such a percentage of methane would not be dangerous unless increased and would not explode and is often to be found in working mines.

Carbon monoxide explodes when over 16.5 per cent. of the gas is present. Air containing over 74.95 per cent. of the monoxide will not explode. The limits have been determined by exposing mixtures to a small electric spark, but would probably be untrue for discharges from Leyden jars. Changes in temperature, changes in the shape of the containing vessel, differences in pressure and moisture content also modify the ranges at which the mixed air and gas will explode.

The Consolidation Coal Company of Maryland, has made a good record in the recovery of coal from pillars during the last five years, ended January, 1911. "Big Vein" pillars yielded a recovery of 86 per cent., 10 per cent. of which was won from workings which had been abandoned from 15 to 30 years, 75 per cent. of the coal standing in pillars in these old workings being recovered. The recovery from pillars under ordinary conditions in the more modern workings is estimated to be over 90 per cent.

Hoisting apparatus that is not equipped with automatic brakes to prevent overwinding, should not be run at a rope speed to exceed three miles an hour, after the cage has reached within two revolutions of the surface. Indicators, showing the engineer the exact position of the cage in the shaft, should always be a part of all hoisting equipment. Where drums are not located on the crank shaft the drum shaft should be equipped with an adequate brake. Before men are lowered or raised the cage should be run up and down the shaft once or twice to see that all working parts are in order, and that the shaft is unobstructed.

To be efficient, rescue apparatus must have the following characteristics: It must be air tight, as the presence of poisonous gas inside the breathing tube would be fatal to the wearer. The supply of oxygen must be abundant and unaffected by the breath exhaled. The absorption of carbon dioxide, generated by the breathing of the wearer, must be quick and thorough. To keep the inhaled air clean, such apparatus as tends to increase the flow of saliva should be equipped with saliva catchers. It should not be so heavy as to impede the movements of the wearer, or so bulky as to be difficult to use in narrow or steep mine workings.

Coal has been known for over 300 years in England. In 1602 the sale at Newcastle, the seaboard, was 190,000 tons. In 1609 the sale was 239,000 tons, of which 214,000 tons was coastwise and 25,000 tons were exported. Up to 1700 there was very little development in coal mining, but after that the collieries were opened and developed rapidly. The ancient English mines were equipped with wooden ventilating shafts, surmounted by an arrangement so fixed as to constantly face the wind. Women were often employed to haul the cars in Scottish mines or to convey the coal from the surface in buckets on their backs. Wooden rails and horses for haulage purposes were introduced in 1745 or 1750.

To avoid danger during shaft sinking, see that all the man-hoisting machinery, such as head gearing, ropes, shackles, chains, hooks, etc., are inspected at least once during each shift. If defects are found, have them remedied at once. Inspect the sides of the shaft at least once during each shift, taking down all loose or overhanging rock, and secure the side with ample timbering. Test the ventilator every few hours with a locked safety lamp. If electric lights are used in the bottom of the shafts during sinking operations, test the air frequently with a safety lamp kept burning nearby. All buckets should be steadied before they are raised or lowered. Care should be taken to see that the filling is 6 in. below the top of all buckets used for hoisting dirt or rock. No explosives should be allowed in the shaft except those necessary for use. There should be only one key to the explosive and detonator cans, and that should be in the possession of the foreman. Secure all ventilating pipes to the sides of the shaft. Use only locked coil ropes to prevent the swinging of the bucket in the shaft. Prohibit the riding of loaded buckets. Have special signals for blasting, and see that they are thoroughly understood and instantly obeyed.

Sociological Department

For the Betterment of Living Conditions in Mining Communities

Rescue Work in British Collieries

SPECIAL CORRESPONDENCE

A Rescue and Aid Order, dealing with the formation and training of rescue brigades and with the supply and maintenance of rescue appliances in British coal mines, has been issued by the Home Secretary. It comes into force at once and applies to all mines except such as employ less than 100 men. These may be exempted from the operation of its provisions. The order requires the maintenance of brigades on the following scale, based on the number of underground employees: One brigade for 250 or less, two brigades for 250 to 700, three brigades for 700 to 1000, and four brigades where more than 1000 underground employees are engaged. Each brigade must consist of five persons.

The circular accompanying the order states that where oxygen-breathing apparatus is used care must be taken to insure that it is absolutely pure. The Secretary of State is advised that it is not practicable to exclude impurities entirely, and that provided the nitrogen in the gas does not exceed 2 per cent., the safety of the users of the oxygen apparatus will not be endangered, but not more than 2 per cent. of nitrogen must be present.

PRESCRIBED COURSE OF TRAINING

The Home Secretary approves the following course of training, and deviation therefrom requires notification and approval.

1. The training to consist of practices with apparatus in a gallery representing the conditions existing in a roadway of a coal mine. The brigade must practice at least once a week for three consecutive months.

2. All the members of the brigade must be trained at the same time.

3. The first practice is to be in a respirable atmosphere and the remainder in one which is irrespirable. Each practice to last at least two hours, unless the instructor deems it desirable to curtail it.

4. The practice must comprise the following or similar operations:

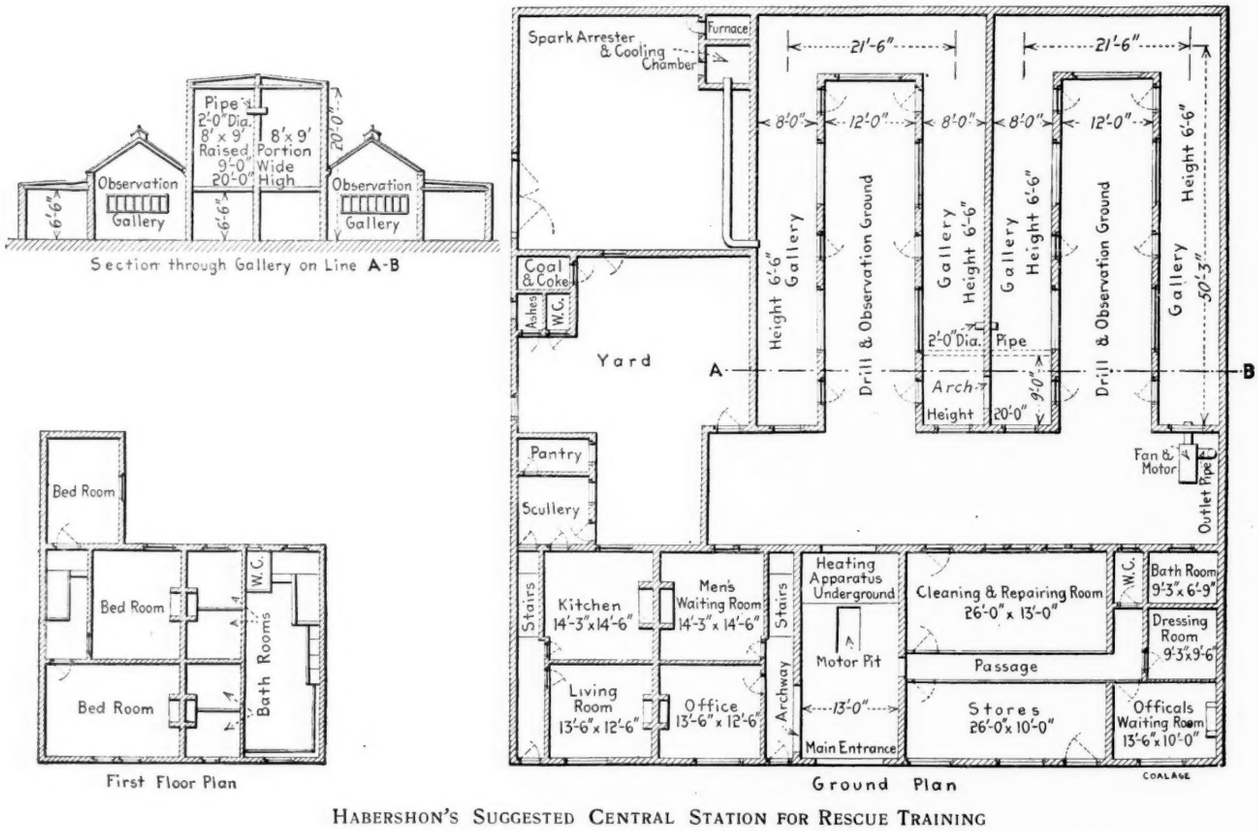
(a) Building and removing temporary stoppings of stone or brick, and carrying the materials required for the same over a distance of at least 10 yards.

(b) Removing *débris* in confined spaces to represent the cleaning of a fall of roof.

(c) Setting timber roof supports.

(d) Carrying a dummy body weighing 150 lb. on a stretcher along the length of the gallery and through an opening 2 ft. high by 3 ft. wide and 4 yd. long.

5. A record must be kept naming each person undergoing training and the date and character of each practice attended.



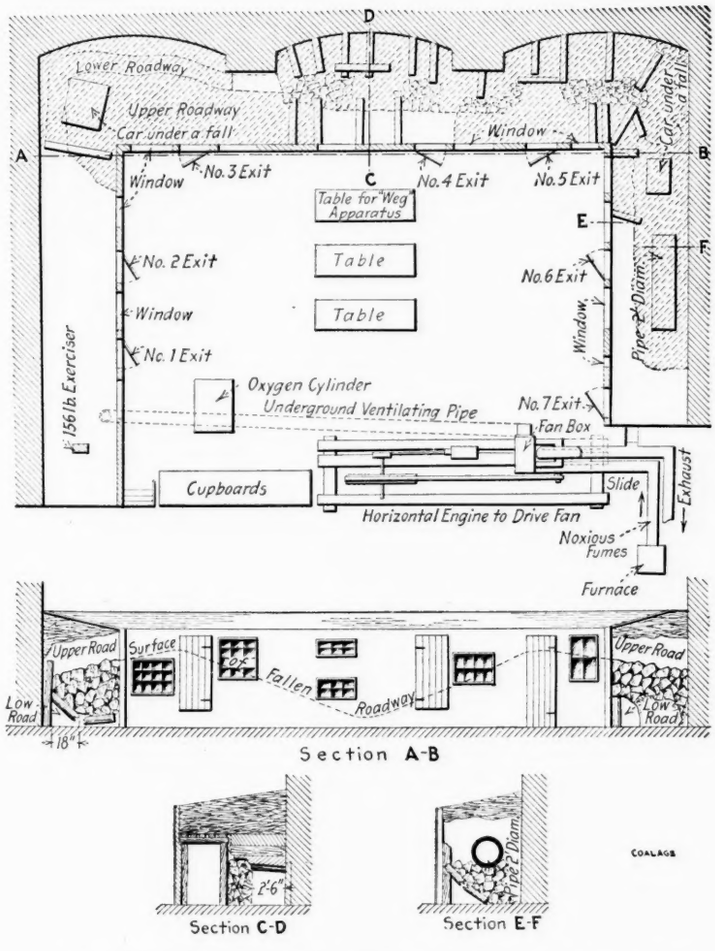
HABERSHON'S SUGGESTED CENTRAL STATION FOR RESCUE TRAINING

THE THORNCLIFFE STATION

In relation to these recent instructions of the Home Secretary, it may be appropriate to recall the evidence of Mathew Henry Habershon, mining engineer at the collieries of Newton, Chambers & Co., Ltd., Thorncliffe, near Sheffield, before the Royal Commission on Mines. Mr. Habershon submitted a plan of the rescue station at Tankersley. This company does not have a gallery, but simply a

practice chamber. His view is that men can be well trained without having any such gallery. The practice room is filled with a noxious atmosphere.

At the same session, Mr. Habershon presented a tracing of a model station for the combined use of a number of collieries which embodies what he thinks is required. The building would cost $8500, the estimate including the whole of the brickwork, drainage, water supply, baths, gas, etc., but does not include any special fittings, such as a fan, furnace or air pipes. Both the plans submitted are reproduced from the Minutes of Evidence.



A Practical Experimental Training Gallery at Altofts Eng.

Good Records for Rescue Apparatus

In the course of his evidence Mr. Habershon gave the following particulars of tests made at the Tankersley Station:

Duration Tests—On Mar. 5, 1907, W. Clifford, of the Strafford Collieries, wore the Draeger apparatus, mouth breathing type, for 4 hr. 3 min., but did no work while wearing it. On Apr. 4, 1907, J. Anderson, of Barrow Collieries, wore the Draeger apparatus, mouth breathing type, for 5 hr. and walked 7400 yards. At the conclusion of this test he was very hungry. This appears to be the most noticeable effect of wearing the apparatus for any long period of time.

Exertion Tests—On Mar. 5, 1907, W. Clifford, of the Strafford Collieries, wore the Draeger apparatus, mouth breathing type, for 2 hr. 20 min. During this time he sawed a quantity of wood props, built brick stoppings, crawled through 50 yards of contracted passages (18x19 in.), dragging a load of 56 lb., walked 2000 yards, ran 2402 yards, taking but one short rest in that length of time. On Mar. 19, 1907, J. H. Thorne, of the Wharncliffe Silkstone Collieries, wearing the Draeger apparatus, helmet type, raised a 56-lb. weight to a height of 7 ft., 600 times in 1 hr. 50 min., doing 235,200 ft.-lb. of work. On Mar. 20, 1907, J. Anderson, of the Barrow Collieries, wearing the Draeger apparatus, helmet type, raised a 56-lb. weight to a height of 7 ft., 610 times in 1 hr. 40 min., performing 239,120 ft.-lb. of work.

Comparative Tests

In addition to the foreging, Mr. Habershon supplied to the commission the appended record of work done with breathing apparatus in the experimental gallery at Pope and Pearson's collieries, on Mar. 23, 1907, before the members of the Midland Institute of Mining Engineers and the Yorkshire branch of the Colliery Manager's Association:

Four men walked 100 yards, crept on their hands and knees 50 yards, picked up a 40-lb. stretcher, carried same through a narow roadway, removed stones weighing 40 to 80 lb., crawled through an air pipe measuring 2 ft. in diameter and 6 ft. long, picked up dummy man weighing 160 lb., placed him on a stretcher and carried the loaded stretcher back to the entrance of the gallery. Two of the men carried fire extinguishers and occupied the rest of the time in fixing timbers and bratticing. Meantime the other two men lifted a 56-lb. weight to a height of 6 ft. repeatedly. The whole time thus occupied was 2 hr. 15 min. The men wore the "Weg" apparatus. Later, to test the Draeger apparatus, four men from the Tankersley Rescue Station, two of whom wore helmets, and two the mouth-breathing type, performed a like feat in the same time. The following is a summary of the work done:

WEG APPARATUS VS. DRAEGER

	"Weg" Team*	Draeger Team†
Walking	1,760 yd.	384 yd.‡
Creeping	320 "	384 "
Traveling over falls	600 "	570 "
Creeping through contracted passages	80	....
Creeping through air pipe	23 times	14 times
Carrying fire extinguishers	8 "	2 "
Fixing brattices	Once	Once
Lifting 56 lb. weight 6 ft.	588 times	762 times
Mechanical energy of 2 men	197,568 ft.-lb.	256,032 ft.-lb.

*One man came out at the end of 1 hr. 11 min., owing to a breakdown in his apparatus. He returned after being out 14 min.

†One man came out at the end of 1 hr. 39 min., his apparatus not working well.

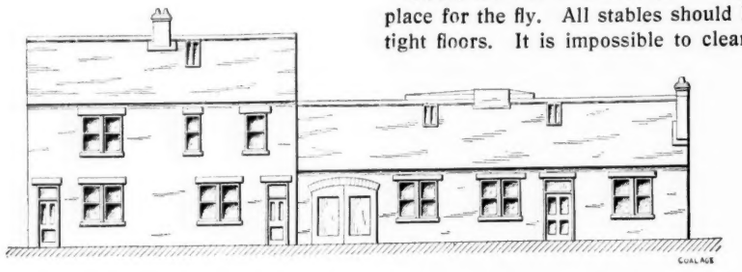
‡These men did not know that any further distance walked would be recorded.

Apparatus Unreliable

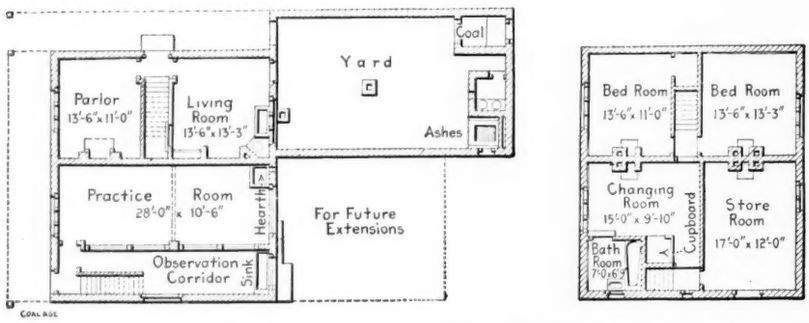
Remarking on the fact that in each case one man had to come out before the full period, Mr. Habershon says this shows that even with the most carefully trained men and the most perfect apparatus at the present time, these difficulties are liable to occur. For this reason he calls attention to the great care required to keep the apparatus in order. This in his view is the great danger to be feared in connection with the establishment of rescue stations. Should an inspection not occur for a considerable time, the practice of the brigades might become lax, or be conducted in a perfunctory manner, and the apparatus not being used in rotation and put in condition, would get out of order. Stations should be supervised by a competent instructor and all apparatus should be carefully inspected and maintained in proper order. Otherwise a false sense of its value might be induced

and in case of a sudden call the consequences might be serious; indeed the apparatus might be worse than useless.

Some interesting evidence was also supplied to the commission by William Edward Garforth, of Altofts Collieries. He explained that some years ago a gallery was erected at Altofts like the roadway of a mine, with passageways both narrow and low for would-be rescue men to practice in. This gallery was filled with noxious fumes. Mr. Garforth also submitted a plan of this experimental gallery, which is here reproduced. He tested all the apparatus which had been brought out, and finally designed the "Weg."



ELEVATION OF HABERSHON'S RESCUE TRAINING STATION



TANKERSLEY, ENGLAND, RESCUE STATION

Sanitation at Alabama Collieries

The Alabama Coal Operators' Association, with headquarters at Birmingham, Ala., has issued a four-page sanitary pamphlet on the fly and mosquito nuisance and the proper method of abatement. The pamphlet was prepared by Morris Knowles and M. R. Scharff, the sanitary engineers, who, on the part of the association, are making a sanitary inspection of the mining camps.

Such sanitary measures are to be commended. They are not only an exhibit of a sense of responsibility of operator to employee, but they can be made to pay dividends by reducing the number of "slow runs" at the mines and by making it possible for the employees to do a fast day's work. Efficiency in the performance of piecework is in the end remunerative to the employer.

"SWAT THE FLY

The fly is an important factor in the spread of typhoid, dysentery, diarrhea, summer complaint and all intestinal diseases.

The fly may spread also tuberculosis, anthrax, smallpox, eye diseases, etc.

Stable manure is a favorable breeding place for the fly. All stables should have tight floors. It is impossible to clean an earth floor properly. Manure should be cleaned from the stalls and collected daily. Manure should never be thrown out on the ground; it should be stored in a tight, covered, flyproof box until removed from the camp. It should be hauled away at least once a week.

Flies may also breed in human excrement, and in decaying animal or vegetable matter of any kind. Change your unsanitary open privies into flyproof closets. Collect all garbage and decaying organic matter at least once a week. Urge your employees to keep their houses and premises clean and to prevent the accumulation of fly-breeding material.

Kill all the flies you can. Put fly traps in your commissary, market, school and boarding houses. Inform all your employees of this campaign and seek their coöperation. Everybody get together and swat the fly!

SOAK THE MOSQUITO

The mosquito is the sole cause of the spread of malaria. Last year there were several thousand cases of malaria and chills and fever in the Alabama coal-mining district. How much did it cost you in lowered efficiency and decreased output? Will you spend a little time and money to prevent the same loss this year? If there are no mosquitoes there will be no malaria.

Mosquitoes breed only in standing or stagnant water, and free access to air at the surface is essential to their development. All standing pools should be filled or drained if possible; if not, enough coal oil or kerosene should be added once a week to form a film over the entire surface. Empty cans, bottles and crockery, and all other things likely to retain rain water, should be collected and hauled out of the camp at least once a week.

Rain barrels, tubs, buckets and other retainers of water should not be tolerated unless screened or oiled. Barrels may be screened with burlap or cheese cloth, held in place by a close-fitting hoop. Unscreened containers should have enough oil added once a week to form a film over the entire surface.

Urge the coöperation of your employees, and encourage the use of mosquito netting. See that every case of malaria is protected from mosquitos by mosquito bar or proper screening. Soak the mosquito!"

Superannuation Funds

In Northumberland and Durham the miners have in operation a superannuation fund, insuring a weekly allowance to aged colliers no longer able to work. It amounts to $1.20 and in a sense represents their own savings. They are also now providing houses or cottages in which the aged people may live rent free. Already several hundred couples are provided with dwellings and so successful has this movement been that it is being enlarged upon. The object aimed at is to make some such provision for all the aged people in the two counties. At present the homes have to be balloted for. The estimate of John Wilson, M. P., is that if all the colliers now working would give to the Miners Home Association 24c. a year each, they would be able to find as much money as they would require for the worn out workers. That is less than half a cent a week, a sacrifice that does not seem to call for a second thought.

The Victor-American Fuel Co., of Colorado, has a system of electric signs which might profitably be copied by other mining companies. At a point 100 ft. from the mouth of each manway and at other prominent points throughout the mine there are located 20x24-in. common glass-faced boxes, fitted out with 4-250-volt direct-current electric lamps The flash of the light, which burns 1½ sec. and is out for 6 or 8 sec., reveals the familiar admonition, "Always be careful" cut on a steel plate in five different languages. This fuel company has always been distinguished by its aggressive campaign for safety in its mines.

Inquiries of General Interest

Questions are not answered unless accompanied by the name and address of the inquirer. This page is for you when stuck—use it

Electricity

(a) Please explain the difference between direct current and alternating current produced by a generator or dynamo.

(b) What is the difference between a dynamo and a motor?

M. J.

Taber, Alta, Canada.

All so-called electric currents are the result of a change of potential or electrical state of two bodies differently charged. The change tends to equalize the potential of the two bodies; and a current is said to flow from that body having the higher potential to the one having the lower potential, in a manner similar to the flow of air from a point of higher pressure to a point of lower pressure.

(a) A direct current is one that always flows in the same direction through the conductor. Practically, one end of the conductor remains constantly in connection with that pole having the higher potential, while the other end likewise remains constantly in connection with the pole of lower potential, so that the flow of current through the conductor is always in the same direction. Any current generated by a voltaic cell or other battery is necessarily a direct current.

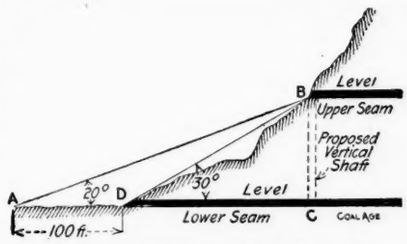
An alternating current is one that changes its direction of flow, so to speak, a number of times a second. Practically, the generator is so arranged that the relation of the conducting wire wound on the armature, changes, with respect to the two poles, each revolution. This causes the current developed in the wire, to change the direction of its flow each revolution. The result is an alternating current.

(b) All electric motors are dynamos; but all dynamos are not motors. It is common to call either a generator or a motor, a "dynamo." A *generator* is a machine that is capable of changing the mechanical energy of an engine or other source of power into electrical energy. A *motor* is a machine for converting electrical into mechanical energy. The generator and motor each act on the same principle, the one, however, being the reverse of the other. In action, the generator consumes mechanical power and gives out electrical power; while the motor consumes electrical power and gives out mechanical power.

Surveying Problem

Please publish the following problem, for solution by readers. I would like to know different methods of working this problem.

Referring to the accompanying sketch, showing the profile of a hillside and two seams of coal outcropping at *B* and *D*, respectively:



CROSS-SECTION SHOWING TWO COAL SEAMS OUTCROPPING ON HILLSIDE

(a) Find the length of a proposed incline or trestle, *AB*.

(b) Assuming that both seams lie level, find the thickness of strata between the two seams or the depth of a vertical shaft, *BC*.

(c) Find the distance *DC* from the outcrop *D* to a point *C*, in the lower seam, at which an upraise should be started to meet the vertical shaft sunk from *B*, in the upper seam.

Pumping into a Tank

When pumping water into an elevated tank, which arrangement will require the greater pressure to fill the tank; entering the column pipe at the bottom of the tank, or carrying it over the top of the tank?

N. D. WILSON.

Dayton, Tenn.

Our correspondent will find a full answer to this question on p. 755, COAL AGE, Mar. 16, 1912. When the pipe is entered at the bottom of the tank instead of being carried up to the top, the actual head against which the pump must operate in starting is reduced by the depth of the tank; but this head increases as the tank fills with water. When the tank is full, the head in both cases is practically the same. When the pipe is carried up the outside of the tank and over the top edge, there is, besides, a slight increase of head over the other arrangement, due to the additional friction of the water flowing through the pipe.

Hoisting Proposition

We are about to change our mine hoist to first motion. At the present time, it takes three revolutions of the engine to make one of the drum. The question I want to ask is, "After making the change, everything else being equal, will the engine use more or less steam for the same load hoisted?" With the first-motion engine we shall use a drum 1 ft. less in diameter than the one we have used with the second-motion engine.

THOMAS GOOD, Supt.,

Washoe, Mont.

The change from a second-motion engine, geared 3:1, to a first-motion engine will reduce the piston speed to one-third of its former value, for the same diameter of drum and the same velocity of the rope.

But the question states that the first-motion drum is to be 1 ft. less in diameter than the original second-motion drum; or assuming the diameter of the latter to be 6 ft., that of the former will be 5 ft. This change in the diameter of the winding drum will require an increase of the piston speed of the engine, in the ratio $^6/_5$ in order to maintain the same speed of winding as before. The combined effect of these two changes will, therefore, be to change the piston speed in the ratio $^1/_3 \times {}^6/_5 = {}^2/_5$. That is to say, in order to maintain the same speed of winding when the load and other things remain constant, the first-motion engine using a 5-ft. drum must have a piston speed $^2/_5$ of that of the original second-motion engine, geared 3:1.

But, moving the same load at the same speed will require the same power in the engine, assuming there is no change in the efficiency. Therefore, for a constant power, if the piston speed is reduced to $^2/_5$ of the original speed, the steam pressure must be increased in the same ratio, or $^5/_2$. That is to say, if the mean effective pressure (M.E.P.) of the second-motion engine was 40 lb. per sq.in. the M.E.P. of the first-motion engine would have to be $^5/_2 \times 40 = 100$ lb. per sq.in., to develop the same power. At this pressure, the density of the steam is practically doubled at sea level.

On this assumed basis, the steam consumption is $^2/_5 \times 2 = {}^4/_5$ of what it was before the change was made. Since the first-motion engine is run at $^2/_5$ of the speed of the second-motion engine but uses steam of twice the density.

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Sundry Examination Questions

(Answered by request)

Dangerous Accumulation of Gas In Middle Section Of Mine

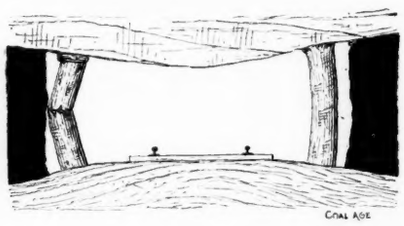
Ques.—If three sections of a mine were ventilated by the same air current and you find upon examination a dangerous amount of gas in the middle section, what would you do to insure the safety of the men; and which of these three sections would need the most immediate attention?

Ans.—Remove the men at once from the third or outby section before any attempt is made to disturb the gas accumulated in the middle section. This is important, because there would be danger of the miners' lamps igniting the gas, which must pass out through this third section. There is no particular danger in the first section, which is receiving fresh air; nevertheless, if the accumulation of gas in the middle section is large, the wisest plan would be to withdraw all the men from the mine before attempting the removal of the gas. It is the third section of the mine or the last section outby, therefore, that needs the most immediate attention. After withdrawing the men as described, the work of removing the gas may be commenced by increasing the volume of air in circulation, and so directing the air current as to cause it to sweep away the accumulated gases. Only safety lamps must be used, and the work must be conducted from the intake side. All approaches to the return current must be carefully guarded. Ample time must be given to allow the air current to dislodge and carry away the gas; and tests must be made, from time to time, to observe the progress of the work.

Mine "Creep"

Ques.—(a) What is a "creep"? (b) How may a creep be stopped and the damage that it is calculated to do localized? (c) What causes produce creep and caves?

Ans.—(a) A creep in mining is any movement or settlement of the roof strata, or the heaving of the floor, in a mine, as evidenced by the crushing of the pillars of coal left to support the roof. Generally, the first indications of creep are the "nipping" or "chipping" of the pillars, close to the roof. The posts and other mine timbers also show signs of taking the weight. It is said then, the roof is "weighting." When the roof in a room or chamber sags or becomes "heavy" it is not necessarily a sign of creep. The effects of creep are more general throughout the mine or district of the mine and these effects advance regularly from the point where the disturbance begins, in a direction depending on the relation of the overburden to the area of extraction of the coal.



Cross-Section Of An Entry Showing Effects of a Heavy Squeeze

(b) A creep when once started can only be stopped by bringing the overburden to a solid bearing, by the extraction of all standing timber and pillars so as to reduce the amount of open area in the mine.

(c) The causes producing creep are, providing too small pillars for the support of the roof; maintaining too large open areas; and lack of uniformity at the working face.

Influence Of Atmospheric Changes On Gaseous Mine

Ques.—What effect does a change in atmospheric conditions at the surface have upon a mine generating explosive gases?

Ans.—Any change in atmospheric conditions at the surface is quickly communicated to the mine workings through the air current. A fall of atmospheric pressure is felt in the mines and results in the expansion of the mine air. If the mine is generating explosive gases, it is often claimed the fall of atmospheric pressure is accompanied by a more free emission of gas from the coal. This effect, however, is practically inappreciable, as far as the gas issuing from the pores of the strata is concerned, since the change of pressure indicated by any possible fall of barometer is very slight as compared with the pressure under which these gases are occluded in the strata and the forces controlling their emission.

The practical effect, in the mine, that accompanies a fall of barometer, is found in the expansion of the air and gases confined in abandoned workings of the mine. When these abandoned workings are not properly ventilated, they are often filled with a dangerous firedamp mixture, which expands on the fall of barometric pressure. Much explosive gas is thus forced out on the mine entries and the adjoining workings in the mine. The increase in the gaseous condition of the mine air from this cause is often very considerable, and necessitates, at times, the withdrawal of the men from the mine. In this connection, it is well to remember that there may be hidden causes that produce practically simultaneous changes in the atmospheric conditions on the surface and in the mine, which changes may render the mine air dangerous.

Changes in temperature in the outside air often produce important effects in the mine, by seriously affecting the state of humidity of the mine air. For example, in the winter, the cold intake air entering the mine, although saturated with moisture, is quickly converted into a comparatively dry air, by the rise of temperature. The weight of moisture carried in the air per cubic foot is the same; but at the higher temperature of the mine this rate of moisture is not sufficient to saturate the air. As a consequence, the mine air becomes dry and absorbs moisture rapidly from the strata and the accumulated dust in the airway. On this account mine workings are naturally drier and more dusty in the winter season than in summer. Other causes, particularly the greater demand for coal in winter, contribute to the same effect. Thus the humidity of the mine air, by preventing the evaporation of the moisture from the accumulated dust, is to that extent a preventive of mine explosions.

Owing to these conditions an explosion of gas or dust in a mine is more likely to occur in the winter than in the summer. The greater demand for coal in winter and the consequent greater activity of mining operations likewise increases the liability to explosion.

Diagonal Roads In Longwall

Ques.—What is the principal reason that cross-entries, in longwall, are driven at an angle of 45 deg., instead of at right angles to the main roads?

Ans.—The diagonal roads afford the shortest possible haulage and means of reaching all points of the working face. The system when properly arranged is more easily ventilated but requires, perhaps, greater skill on the part of the miners than the less common square or rectangular system sometimes used.

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers

Washington, D. C.

Further important action has been taken by the Interstate Commerce Commission in connection with several important cases which have been pending before it for a good while.

In the case of Consolidated Fuel Company *vs.* the Atchison, Topeka & Santa Fé R.R. Co., an opinion has been rendered to the effect that the present relation of rates on coal to points on the Oregon short line is unduly discriminatory. The railroad company is also required to establish through routes and joint rates from the Utah mines to all points taking such rates from the Rock Springs Mines. The Commission has, however, reserved for further examination the right of the complainants to have the routes and rates prescribed extended back over their industrial lines to their respective mines.

That the Commission apparently contemplates a somewhat elaborate inquiry into coal conditions in this region for the future is shown by the following statement concerning the conditions obtaining in the region in question:

Notwithstanding the close relations between these short lines and the industrial companies that own them, there are indications of the need of further information before a final disposition may properly be made of this part of the complaint. While we have referred to this section of Utah as a coal-mining district, as a matter of fact only three coal companies, the mines of which are close together, are independent. Although there are seven or eight other mines, they belong to the Utah Fuel Co., which is owned by the Denver & Rio Grande itself. Only one of these mines is on its main line. The others, like the independent mines above described, are in the mountains, and are reached by two branch roads constructed and operated by the Denver & Rio Grande, one 17 miles and the other about 21 miles in length. These lines apparently are also constructed along the side of cañons. Doubtless there are mining towns near the mines, but the details of the traffic over these branches are not of record. On the whole, we think that the record should be amplified so as to disclose what the general situation is. It is desirable also to be advised of the practice of the Denver & Rio Grande elsewhere in making rates with short lines of this character.

The question of rates for the transportation of lake cargo coal is dealt with in an opinion just handed down, relating to the New Pittsburgh Coal Co. *vs.* the Hocking Valley R.R. Co. It is found that the present rate of 75 cents per net ton for the transportation of lake cargo coal in car loads when for transshipment by vessel to points without the State of Ohio is not unreasonable. The more interesting feature of the case is, however, found in what the Commission has to say with reference to its jurisdiction over the transportation of vessel fuel coal from points within the State of Ohio to a port of that state, the rail carriage not going outside of the State and the ultimate delivery of the coal being made at the vessel at the dock. In such cases the Commission finds that it is without jurisdiction, although it has jurisdiction in those cases where the transshipment is to take the coal to points outside of the State.

The New Government Collier

The government collier "Orion" arrived at the Curtis Bay coal piers of the Baltimore & Ohio R.R., to take on a cargo of coal for the fleet of battleships in the Delaware Breakwater, returning thence to Hampton Roads. The "Orion," a sister collier to the "Neptune," has a capacity of 13,000 tons, and is being loaded with 10,500 tons of cargo coal and 2150 tons of bunker coal. This latest addition to the government collier service is on her maiden voyage.

The "Orion" is one of the two most modern types of collier afloat, being constructed almost entirely of steel and equipped for burning either oil or coal for fuel, so that on a long voyage to the Far East to coal a fleet, she could make the journey burning oil for fuel should the supply of coal in her bunkers become exhausted. The collier is 514 ft. long and 65 ft. wide, the depth of the hold being 39 feet.

The loading is being conducted under the supervision of E. E. Brewer, agent for the railroad at Curtis Bay.

Alabama

Birmingham—The National Mine Inspectors' Institute will meet in Birmingham in 1913.

Colorado

Colorado is credited with an output of 10,157,383 short tons of coal for the year 1911. In dollars and cents this amounts to $14,747,764. It does not, however, equal the record for 1910, which was 11,973,736 short tons, valued at $17,561,917.

Illinois

Bloomington—The work of sealing the drop shaft in the mine of the McLean County Coal Co. has proved a greater undertaking than was at first anticipated. When the mine was unsealed some three or four weeks ago, following the fire, and an inspection of conditions below was made by state mine inspectors, it was found that there was considerable fire in the drop shaft. The officials of the company decided that it would be an advisable move to seal this shaft permanently.

Cairo—A large stratum of coal is thought to exist near Mt. Carmel. So certain are the indications that the city is backing a project to bore and ascertain whether or not they are correct.

Evanston—A company of Evanston business men has begun operations for the reopening of a large coal mine four miles north of here, which has not been worked for 40 years. New machinery has been purchased by the company, most of which has been delivered at the mine, and the construction of the necessary buildings and power plant will be begun within a short time. It is said that, with proper development, the mine may be made one of the largest producers in this portion of Wyoming.

Jacksonville—Preparations are now in progress for reopening the Springfield mines early in July, and the long period of suspension is nearing an end. Several of the mines expect to be ready to resume operations within a few weeks.

Litchfield—The Sorento mine has run each working day but two since its start the first of June. About 120 men are employed and a fair tonnage is being hoisted. The C. B. & Q. R.R. is taking a part of the output and coal is being shipped to the northern part of the state.

Tilden—The Aluminum Ore Co., owner of the proposed Denverside Connecting Ry., has been quietly acquiring several thousand acres of coal land near Tilden, together with a district known as Shiloh Valley. The purpose of the acquisition has not been divulged.

Indiana

Indianapolis—Whether the strike in the pit mining industry in Indiana will be extended depends largely on the action of the International Board of the United Mine Workers at a meeting to be held in July at Indianapolis. At this meeting the officers of District No. 8 will present an

appeal for strike funds with which to extend the strike to all the pits where coal and clay are mined in the black coalfield. If the funds are granted the work of organizing the pitworkers will be extended, and if not, the miners will be handicapped in the work of organizing.

Kansas

Leavenworth—The prospects for a larger development of the coal interests in this vicinity look brighter than for a number of years. There has been an immense decrease in the production of oil, with a consequent increase in the price and the reduced supply of fuel oil is expected to create a great deal of new business for the coal operators in this section of the country.

Louisville—The federal court, at Louisville, has appointed Edward T. Alexander receiver of the Elk Valley Mining Co., of Drakesboro, recently declared in bankruptcy, with liabilities of $100,000. The mine is flooded and has been idle for some time. The court instructed the receiver to make arrangements to resume operations for the benefit of the creditors, who have agreed to advance the necessary money.

Pittsburg—The Steam Shovel Mines owned by the Durkee Coal Co. and the Miller Coal Co. are flooded with water, which is running out over the surrounding country. The other six mines in Cherokee County and the Skidmore district are filled with water, and work will not be resumed until the water is out and the rain stops.

Coal has been struck on the tract of land now being opened by the Cherokee & Pittsburg Coal & Mining Co., at the depth of 79 ft. The bed is between 3 and 4 ft. thick and is a good quality.

Kentucky

Winchester—The Louisville & Nashville R.R. has announced that it will build a line 26 miles long from Winchester southeast to Irving, Ky., and a short connection between Beattyville and Athol, Ky., which will link the Louisville and Atlantic divisions with the extension to the eastern Kentucky coal field that is now approaching completion.

Michigan

Arenac—A 3-ft. bed of good quality coal has been found 23 ft. below the surface. The discovery was made on E. Van Natter's farm, where indications of fuel have often been found.

Detroit—It has been rumored here for some time that a body of large independent operators, headed by Edward Posten, of the New York Coal Co., and J. P. Cummisky, of the Ohio & Michigan Coal Co., will incorporate under the name of the Independent Hocking Operators for the purpose of building two or more large coal docks at the upper end of Lake Superior. The independent operators claim that they have not been receiving proper treatment, and have decided to control their own docks and points of distribution.

Bay City—Mine No. 7, of the Robert Gage Coal Co., has closed down for the summer, it is stated, throwing about 200 men out of employment. Mine No. 5, so far as is known at the present, will continue to run.

The new hoisting engines on the Mahanoy Plane of the Philadelphia & Reading R.R. Co. were tried out, June 19, and several cars of coal were hoisted up the mountain. The Reading company has recently spent $1,000,000 on improvements to this plane and the storage yards at St. Clair.

Knoxville—The Southern Appalachian Coal Operators Association will hold a convention in this city, July 25, and a large gathering of leading coal men from all over the South is expected. An elaborate program is being arranged..

Ohio

Ohio coal production for 1911 was 30,759,986 short tons. Although this output is far below the 1910 record of 34,239,668 short tons, it still is in excess of the market requirements. The percentage of machine-mined coal, however, increased from 84.44 to 86.5.

Columbus—The Starr-Hocking Coal Co., which operates mines at Coonville, Ohio, is getting ready to open its mines which have been closed for several months, and has recently installed a coal washer which will be operated from this time on. President Hargreaves says that 10,000 tons of coal were recently handled at the expense of 5c. a ton when the washer was only in partial operation.

Coshockton—The Warwick mine, located near here, has made a record for hauling coal last spring. During the day more than 500 tons of coal passed over the screens. The mines are now equipped with electric devices and the coal is hauled with electric power.

East Liverpool—Operations start this week at the Quaker Valley Coal Mine at Rogers, which has been idle for 14 years. Arthur P. Mullen, of Salem, Ohio, and Willis Baysinger, of New Philadelphia, Ohio, have formed a new company among other coal operators in Columbiana County, and hereafter the mine will be operated on an extensive scale.

By Sept. 1 about 150 miners will be put to work. A lot of preliminary improvements have to be made before shipping is undertaken.

A lease had been taken on 1000 additional acres of six-foot vein coal territory, and the output of the mine is to be increased to between 350 and 500 tons per day.

Oklahoma

Guthrie—Two of the Sans Bois Coal Co.'s mines, at McCurtain, which were closed following the disaster at that place some weeks ago, have been reopened by permission of the state mine inspector. Mine No. 2, wherein the explosion occurred, however, is still closed. Mine No. 1 has been provided with a new shaft for improving the ventilation of the mine.

Oregon

Portland—It seems probable that in the near future development of coal deposits on the lower Columbia River in the vicinity of Columbia City will be undertaken by E. C. Giltner and associates who own about 1000 acres of land in that region. An examination of the property has revealed a seam of lignite in the upper strata which carries 40 per cent. of fixed carbon, and seams carrying a considerably higher percentage, in the lower strata. It is believed that a big demand will readily be found for the coal, which lies within a radius of 30 miles from the city of Portland and can be brought in either by railroad or by the Columbia River. It is planned to manufacture the lignite into briquettes.

The Interstate Commerce Commission announced on June 18 that it would start on its own volition a general investigation into the rates, practices and regulations governing the transportation of anthracite coal. The committee on the coal supply of New York City, appointed by the Merchants' Association to investigate the anthracite situation, has decided that on account of the comprehensive investigation into the subject which has been started by the Interstate Commerce Commission and other federal and state bodies, it would, for the present, drop its inquiries into the matter.

Pennsylvania

BITUMINOUS

Connellsville—The Connellsville coke trade has suffered a decrease of 7000 tions in its production. The merchant coke seems to have suffered the most, having dropped 5500 tons. Short labor supply, holidays for overworked labor, repairs of plants, all helped to account for this decrease.

Johnstown—The Coal Mining Institute of America held its fifty-sixth session in Carnegie Library Hall last week. Among the interesting features were a "First Aid" demonstration and a trip through the Cambria Steel Co.'s works.

McKeesport—The old Risher tipple of the Monongahela River Consolidated Coal Co. is being torn down after having stood for more than 50 years. The coal will now be shipped over the Wabash R.R. and taken from the mines at Buttermilk Hollow.

Patton—Mine No. 33, one of the largest workings of the Pennsylvania Coal & Coke Co., has closed down, throwing about 300 men out of work. Other mines of the company are running about half time.

Pittsburgh—New York financiers are planning to organize a gigantic merger of five of the largest independent coal-mining companies operating in the Pittsburgh seam. A $50,000,000 stock and bond issue is proposed, and an annual production of 10,000,000 tons is assured, with an unmined acreage of 40,000 acres. The president is to be chosen from among the heads of the subsidiary bodies, with headquarters at Pittsburgh.

Waynesburg—W. S. Paterson has closed a deal for the sale of a tract of coal in Perry Township to Frank A. Gump, of Mt. Morris. The coal underlies the Lemley tract, and contains 183 acres. The consideration was $73,500.

ANTHRACITE

Pancoast—The coal mine on the Hudson Farm is being reopened. It is to be operated by the Wallwork Coal Co.

Pittston—The Twin shaft seems doomed to misfortune. Fire has broken out in the fan house which supplies the air to the mine, endangering the lives of the 300 men and boys employed underground. Many have gotten out in safety and the others are being warned of their danger. The mine is owned by the Lehigh Valley Coal Co.

Pottsville—The old abandoned Salem colliery will be reopened by a company headed by Hugh and Mark Dolan. Boreholes have revealed lost veins nine feet thick.

Scranton—An ordinance regulating the mining of anthracite coal under the streets and public highways of Scranton has been introduced in the council. The ordinance makes unlawful, reckless and careless mining of coal under the city streets, and provides penalties for violation of the provision of the ordinance.

The need for such a regulation is shown by the recent cave-in at the Erie car shops in Dunmore. The damage done amounted to $50,000.

Texas

Poteet—The Poteet Coal & Sand Co. has discovered an 11-ft. bed 35 ft. below the surface, a 6-ft. bed 67 ft. below, and one 7 ft. thick at a depth of 92 ft. Development work is being started at once.

West Virginia

Eckman—There is considerable talk of the West Virginia Power Co. entering the Island Creek field of the C. & O. Ry., and the Thacker field of the N. & W. Ry. This company, it is learned, is an enterprise of the Westinghouse people, who have recently acquired sufficient water power on New River to develop 450,000 hp. They are considering the construction of a steam plant to develop power for the two fields above named. The West Virginia company, together with the Appalachian Power Co. will shortly be in a position to supply power for all the operations in the C. & O. and N. & W. fields, that may desire it. The latter company, is understood to be an enterprise of the General Electric Co.

Fairmont—A large tract of No. 2 gas in Logan County was sold recently by Seymour McIntyre, D. M. Price and C. E. Hawker, for $35,000. The names of the buyers were not made public.

Wheeling—The property of the Rex Carbon Coal Co. has been sold at public auction for $100,000.

Wyoming

Kemmerer—No. 4 mine will be opened again by the Union Pacific Coal Co. after an abandonment of eight years. This will probably increase the population of the town two or three hundred.

Bohemia

Carlsbad—There are three centers of the soft-coal-mining industry in this region—at Brüx, Komotau and Falkenau—and the mines were operated with full forces during 1911. In the Brüx district, 19,819 miners produced 13,000,000 tons during 1911, valued at $12,456,000, of which 73% was used in Austria and the remainder was exported. Each miner produced about 652 tons, valued at $629. In the Komotau district, 2226 miners produced 1,600,000 tons, valued at $1,481,900. In the Falkenau district 5016 workmen mined 2,780,000 tons, valued at $2,500,000.

Canada

Alberta—A syndicate of Washington and Idaho capitalists, represented by Chas. H. Bell, of Spokane, and C. E. Merwin, of Moscow, Ida., has brought the Dunn coal mines at Lake Wabamum, Alta. Although the price has not yet been made public, it is reported to be the largest ever paid for northwestern property. The Security Coal Mines Co. Ltd., of Edmonton, a million dollar corporation, will develop the mines on an extensive scale. The property lies a mile north of Wabamum station and less than a mile from the Grand Trunk Pacific R.R., and consists of 880 acres. The seam, which lies at a depth of about 40 ft., is described as semi-bituminous, or high-grade lignite, and, according to Dowling's report, is over 20 ft. in thickness. Development work will begin at once in order to be ready with a large output next winter. Retail yards will be established in every town between Edmonton and Saskatoon, it is said, and a large distributing yard will be established at Edmonton.

Calgary, Alta.—According to information from New York, the Chicago, Milwaukee & Puget Sound Ry., the Pacific Coast extension of the St. Paul, is considering plans for building a line from Butte, Mont., through the Flathead Valley, into Canada. The proposed line, it is stated, has already been surveyed, but no definite time has been announced for the beginning of the work. The St. Paul has valuable coal deposits just across the line in Canada, which is assigned as a reason for building the proposed extension. The road would be within easy reach of Regina or Calgary. The directors of the Puget Sound are said to have also decided informally on the building of an extension into Vancouver, B. C., with a view to reaching that port soon after the opening of the Panama Canal.

Ottawa—Attention has been directed recently to the mining resources of New Brunswick. The Canadian Pacific Ry. has leased from the provincial government the branch from Minto to Norton on the Intercolonial Ry. and undertakes to carry over the line 50,000 tons of coal each year for ten years. This will mean a considerable enlargement of operations at the mines, but a much greater development is anticipated. Outside interests have been looking over the coal fields and among other rumors is one that the Allan Steamship Co. desires to secure a source of coal supply there, as another steamship company has already done.

Hungary

The production of coal for 1911 amounted to 9,836,000 tons, an increase of 800,000 tons over the production in 1910. There are vast resources of coal which have not as yet been touched. Although this coal is not of the first quality, modern mining methods would make it a paying proposition.

Nova Scotia

Sidney—The coal mines of Cape Breton form a basis for the iron and steel works, and upon these latter depend other large industries. The production of the collieries of Cape Breton during 1911 was greater than during 1910, although work was suspended in some of the mines on account of water or other accidents. The greater part of the output is sent to upper Canada via the St. Lawrence River. During 1911 coal to the value of $617,172 was exported to the United States. The Nova Scotia Steel & Coal Co. (Ltd.) suffered a decrease in output, due to a disastrous explosion at one of its most active collieries in January, 1911.

Personals

L. A. Shaffer, recently with the Asher Coal Agency, has become manager of the Samuel R. James Coal Co. He was for 14 years with the Louisville & Nashville R.R. Coal Co. and its successors, the Jellico Laurel Coal Co.

After more than seven years' service as assistant geologist of the Kentucky Geological Survey, and having previously had charge of mines for four years, F. Julius Fohs has opened an office for private professional practice at Lexington, Ky.

C. E. Gangloff, of Schuylhaven, has left for several weeks' stay at Ebensburg, Cambria County, in the interest of several large bituminous-coal operators. He has charge of the legal end of what will be one of the largest soft-coal deals in recent years.

I. S. Underhill, president of the Underhill Coal Co., of Buffalo, was married on June 25 at Ithaca, N. Y., to Miss Edith Sterling Nichols. After spending the summer at Lake Placid Club in the Adirondacks, Mr. and Mrs. Underhill will reside in Buffalo.

James C. Kolsem, president of the Indiana Coal Operators' Association, is the Democratic candidate for senator in the Indiana legislature from Vigo County. W. D. Van Horn, president of the District No. 11 United Mine Workers, is his opponent on the Socialist ticket. A. Catlim, a practical miner, is the Republican candidate.

Arthur Moren has tendered his resignation as superintendent of the Southern River Division of the Monongahela River Consolidated Coal & Coke Co., to become effective July 1. It is understood that he will be identified with the organization of a river fleet planned by the Crucible Steel Co. for taking products south and west in barges.

Julius Surmond, graduate from the London Mining Institute, will deliver a lecture on practical mining at the meeting of the Mining Institute at Terre Haute, Ind., July 5. Mr. Surmond has been identified with the State Bureau of Mining for several years and is well known to the practical miners throughout the Indiana coal fields.

D. M. Price has tendered his resignation as general manager of the New Aetna Coal Co., to take effect July 1. Mr. Price has been connected with that company for eight years, having started there as bookkepeer and worked up from that position to the office of general manager, to which he was promoted in March, 1911. His future plans are not yet known, but it is thought that he will again go into the coal business with some other company.

Obituary

John Mason, a prominent coal merchant, died in the Royal Victoria Hospital on Sunday after a brief illness. He had just undergone an operation and was thought to be on the way to recovery when death came suddenly. Mr. Mason was born in Quebec in 1844, and coming to Montreal 40 years ago engaged in the coal business, being with the Lackawanna company for the last few years.

Publications Received

JOURNAL OF THE CLEVELAND ENGINEERING SOCIETY, June, 1912. 87 pages, 6x9 in. Published quarterly by the society. $2 per annum.

COAL MINE ACCIDENTS IN THE UNITED STATES. A Preliminary Statement Published by the U. S. Bureau of Mines. 13 pages, 6x9 in.

THE BEHAVIOR OF NITROCLYCERIN WHEN HEATED. By Walter O. Snelling and B. G. Storms. Technical paper No. 12. U. S. Bureau of Mines. 14 pages, 6x9 in.

COAL OF THE REGION DRAINED BY THE QUICKSAND CREEKS. By F. Julius Fohs. Bulletin No. 18, serial No. 25. Kentucky Geological Survey. 79 pages, 7x10, 8 diagrams. Printed by the Interstate Publishing Co.

A NEW ANALYSIS OF THE CYLINDER PERFORMANCE OF RECIPROCATING ENGINES. By J. Hall Clayton. Bulletin No. 58, University of Illinois, 104 pages, 6x9, with diagrams. 60c. Published by the University.

CALC AND SERPENTINE OF NORTHAMPTON COUNTY, AND THE PORTLAND CEMENT MATERIALS OF THE LEHIGH DISTRICT. By Frederick B. Peck. Report No. 5, Topographic and Geologic Survey of Pennsylvania. 65 pages, 6x9 in., illustrated. C. E. Aughinbaugh, Printer to the State of Pennsylvania.

THE FACTOR OF SAFETY IN MINE ELECTRICAL INSTALLATIONS. By H. H. Clark. 14 pages, 6x9 in. Technical paper No. 19. U. S. Bureau of Mines.

The pamphlet deals with fires and explosions caused by electricity and gives methods of prevention of accidents caused by electricity.

COALFIELDS AND COLLIERIES OF AUSTRALIA. By F. Danvers Power. 400 pages, 6x9 in., 229 illustrations. Published by Critchley Parker. Price, 25s.

An important feature of this book, from the publisher's point of view, lies in the fact that it is written, printed, bound and published wholly in Australia. It deals with the modes of occurrence of Australian coal beds, the classification and analyses of coal, the methods of working, selling and shipping, the labor conditions in the different fields and the nature of the machinery used.

Industrial Notes

The Virginia Coal Briquetting Co., capitalized at $50,000, is now ready to sell sample lots of its products. This product is oval in shape, two inches each way and weighs about two ounces. It is composed of a blende of anthracite and bituminous coal, powdered, and mixed with an emulsion of crude oil and flour, which is compressed in shape and subjected to a high degree of heat which makes it solid.

Construction News

Boswell, Penn.—The Somerset Smokeless Coal Co. is working on a number of extensive improvements, one of which is a wireless-telegraph system between Boswell and Jerome.

Indianapolis, Ind.—The Indianapolis Gas Co. has decided to erect a new coke- and gas-manufacturing plant with a daily capacity of 6,000,000 cu.ft. of gas. Carl H. Graf is vice-president and general manager.

Bristol, Tenn.—The Clinchfield Corporation is planning to open new mines and install a large amount of new mining equipment. This corporation has about 300,000 acres of coal land on which it has extensive lease.

Wellsburg, W. Va.—A charter has been issued to the Brooks County Coal Co., with an authorized capital stock of $600,000, to operate coal mines, manufacture coke and new general mining business. Their principal offices will be in Charleston.

Sullivan, Ind.—The Indiana Coal Co. has filed article of incorporation with the Secretary of State. The capital stock is placed at $200,000. The object of this company is to conduct mining operations and shipping of coal and their place of business will be Sullivan.

Evansville, Ind.—The Southern Petroleum Co. has just been incorporated at $50,000. The purpose of the company shall be to secure and locate mines and sell oil, gas and coal by drilling wells and installing machinery to develop the resources of the land. J. H. Hauley, A. E. Geist and O. V. Geist are directors.

Williamson, W. Va.—The Williamson & Pond Creek R.R. Co., of Kentucky, has been admitted to West Virginia and will extend a branch across Tug River into Mingo County. This railway is an auxiliary line of the Norfolk & Western, which taps the coalfields of southern West Virginia, including Mingo County.

White Sulphur, W. Va.—A new coal and timber railroad is to be constructed in Greenbrier and Pocahontas County, a charter having been issued to the White Sulphur & Huntersville R.R. Co., with principal offices at White Sulphur, W. Va. The company has an authorized capital stock of $30,000 and proposes to construct a railroad from White Sulphur to Huntersville.

Clinton, Ind.—The Deering Coal Co., operated under the laws of the state of Illinois, with headquarters in Chicago, has been admitted by the Secretary of State to do business in Indiana. The company will do a mining business and a coal-land developing business by sinking shafts and operating coal mines. The capital to be used in Indiana is $50,000. Duncan B. Medel is the freight agent.

Charleston, S. C.—The Carolina, Clinchfield & Ohio R.R. will build big coal docks at Charleston, S. C. They will be of reinforced-concrete construction and the superstructure will be built entirely of steel. The initial development provides for one car bumper with a capacity of 30 to 45 cars of ore. From the bumper the coal will be delivered by a belt-conveyor system directly to the vessels or to storage. The present plan includes about 2½ miles of belt conveyors ranging from 36 to 60 in. in width. The whole scheme practically eliminates hand labor, as even the trimming of the cargo will be done mechanically.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

While the usual summer dullness still prevails, there has been some indication of improvement during the past week. This was shown principally by the reports of both car and labor shortages in the mining districts. The car shortage may be partly ascribed to the activity in steel circles, considerable of the coal equipment being diverted for use in that business. The labor shortage is, however, becoming an important consideration; were mines working up to anything like full capacity it is doubtful whether sufficient men could be obtained.

The Eastern bituminous situation is down to a low point; cargoes continue arriving on consignment, and Pocahontas and New River are now selling down to the low prices of 1911. Embargoes are being declared at some points and only a rigid curtailment can relieve the price situation in August and September. In anthracite, the reverse obtains; sales agents are finding it difficult to supply their customers and much disappointment is experienced over the small receipts.

Operations in the Pittsburgh bituminous districts are increasing, and while the manufacturing demand is only fair, the Lake trade is steadily improving. Efforts to maintain prices have now been abandoned, but the majority of the mines are operating full capacity or up to the limit of the labor supply.

A number of the large railroad fuel contracts, which have been pending for some time in Ohio, have now been awarded. The Lake trade is also showing greater activity, the tonnages being large and increasing. The Ohio mines are now working fairly good and probably producing more than at any time since the wage scale was signed up. Iron-ore shipments from the Northwest are so heavy that many of the vessels are unable to obtain coal tonnages, and are returning light. The Virginia and West Virginia markets are slower than for some time, but operators are still holding firm on prices, except for some sales of demurrage coal; mines are only running about half time or less.

In the Middle West, the prices are maintaining a substantial firmness except in slack, which is weak on spot sales. Satisfactory tonnages are being received at the head of the lakes, but there is a noticeable absence of buying for stocking purposes. The indications are, that the next week or two will see some improvement in the situation.

Boston, Mass.

The bituminous market is weaker, if anything. The Virginia terminals are still full of coal, and selling agencies are leaving no stone unturned in the effort to find a dumping ground. Cargoes continue arriving on consignment and small buyers both inland and at tidewater are beset with offers. All told, the summer prospect is not promising.

Pocahontas and New River are selling down to the low level of 1911 and only a rigid curtailment can relieve the price situation for August and September. Embargoes are the rule and were it not for line and Western business many operations would be at a standstill. Little is heard of contract now but if a large buyer appears in the market such vigorous competition is stirred up that he hesitates to close. Georges Creek, while being held firm at the season price, is sluggish along with other grades. All-rail trade is rather steadier and more dependable.

Anthracite has a serious look. Most of the companies are out of the Eastern market and shipments are increasingly slow and difficult. Stove coal was the short size, but now there is practically no white ash to be had in any size. Try as they will the sales agents are finding it impossible to satisfy customers and there is much disappointment over the slim receipts this side of New York.

Retail contracts continue to be taken at low figures. The U. S. Post Office building, Boston, recently had for low bids, $4.15 for New River, and $2.95 for anthracite screenings, both gross tons and under severe specifications.

Present quotations at wholesale are:

Clearfield, f.o.b. mine	$1.05 @ 1.30
Clearfield, f.o.b Philadelphia	2.30 @ 2.55
Georges Creek, f.o.b. mine	1.52 @ 1.62
Georges Creek, f.o.b. Philadelphia	2.77 @ 2.87
Pocahontas, New River, f.o.b. Hampton Roads	2.50 @ 2.60
Pocahontas, New River, on cars Providence	3.30 @ 3.45
Pocahontas, New River, on cars, Boston	3.40 @ 3.55

New York

Bituminous — The bituminous trade continues at the low level customary at this time of the year. There are few spot transactions but, on the other hand, there are no evidences of any appreciable tonnages on demurrage. The stocks at South Amboy, which are usually about 1800 cars at this period, are now somewhat low, probably about 1200 cars.

One of the principal items of interest in trade circles at the present time, is an indication of a possible car shortage. This is ascribed to the activity in steel shipments, as it is said that considerable of the coal equipment is being diverted for this use. If the railroads are unable to satisfactorily handle the coal tonnages at this period of the year, there is liable to be an acute shortage when shipments become heavy in the fall. There is also a distinctly noticeable shortage of labor in the mining districts, and were operations up to full capacity, it is believed sufficient men could not be secured.

A further slight decline in prices has gone into effect, quotations now being about as follows:

West Virginia, steam	$2.35
Ordinary grades, Pennsylvania	2.45
Fair grades, Pennsylvania	2.55@2.65
Good grades, Pennsylvania	2.70@2.75
Best Miller, Pennsylvania	2.95@3.00
Georges Creek	3.15

Anthracite—The anthracite trade continues quite active, with shipments still considerably behind requirements. Stocks are far below normal for this period of the year, and there seems little doubt, but that there will be a decided shortage the coming winter. The general advance of 10c. per ton went into effect the first of this month. Unfilled orders, placed at last month's low level, are being carried over and will be filled at the new high price.

The prevailing anthracite prices in New York are now as follows, the L. & W. being at the upper ports and the L. & S. at the lower:

	L.&W.	L.&S
Broken	$4.80	$4.75
Egg and stove	5.05	5.00
Chestnut	5.20	5.15
Pea	3.50	3.45
Buckwheat	2.75	2.45
Rice	2.25	1.95
Barley	1.75	1.70

Pittsburgh

Bituminous—Operations are slowly increasing. While manufacturing demand is only fair, shipments are heavier in the Lake trade and prospects are that a new record will be made in the movement. The majority of the mines are operating full, or up to the limit of the labor supply. Prices are not strong in proportion, and although the wage scale is higher this year, all effort to maintain higher selling prices have been abandoned. We quote the following as approximately the market, being figures which leading sellers are endeavoring to maintain: Nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35; slack, 75c. per ton at mine, Pittsburgh district. Slack is being

cut much more than any other grade, usually selling at 50@60 cents.

Connellsville Coke — The operators continue to work closely together in the effort to secure $2.50 on second-half furnace-coke contracts. Many ovens were banked on last Saturday, and there is a definite program of banking one oven out of so many, in the case of operators not having contracts on which to ship. This will cut down the output, and in addition there is the reduction which will occur this week on account of the holiday. The aim has been to bring the prompt market above the $2.50 asking price on contracts, as otherwise it is recognized furnaces would not contract. Sales of prompt furnace coke were made early Monday morning at $2.35, there being only a little available at this figure, and later the market firmed up so that 50 cars or more were sold at $2.50, the indication being that by the end of the week prompt furnace coke would be bringing $2.75. We quote: Prompt furnace, $2.50; contract furnace (asking price), $2.50; prompt foundry, $2.40@2.50; contract foundry, $2.40@2.75.

The *Courier* reports production in the Connellsville and lower Connellsville region, in the week ending June 22, at 373,729 tons, a decrease of 18,000 tons, and shipments 4208 cars to Pittsburgh, 6072 cars to points west and 1084 cars to points east, a total of 11,364 cars, a decrease of 500 cars.

Philadelphia, Penn.

The first week under the advance of 10c. per ton on anthracite still shows the market to be rather inert. Orders that were entered in June and not shipped during that month, have most all been covered by renewals for shipment at the current prices in July. Tidewater business still continues heavy, and this includes all sizes, broken and chestnut probably being easier than the others. Steam sizes still continue to be a drug in the market and what little is being shipped, except on contracts, is selling at prices less than the circular. This, of course, is being done by the individual operators. The large companies are not inclined to recede from their announced prices.

There was a little stir of business at the close of the month of June, due to the fact that prices would be advanced on the first, but as a rule the trade is rather slow. There is considerable inquiry from the south for shipments at tidewater, the past winter having been so severe that most, if not all, of the stocks of anthracite have been cleaned out, but the available supply of vessels is small, and it will probably be late in the season before this market will be satisfied. Line and city trade is reported to be very dull, and there is not much expected during the months of July and August. Prices for July are: Egg, $3.55; stove, $3.80; chestnut, $3.95.

There is no visible improvement in the bituminous trade. Some coal is moving on contract, but very little new business is to be had, stocks that were taken on before and during the strike in the anthracite fields still holding out.

Baltimore, Md.

There is absolutely nothing in the market here to attract attention. Inquiry at the offices of the large operators failed to show any improvement in the demand, and it must be admitted that the trade is getting about down to the low point.

Three or four weeks ago there was evidence that the coal business would be at least fair during the summer months. Better business was reported in many lines of trade, which caused these industries to go into the market for a small supply of fuel, local companies being called upon to supply a large part of this demand. Since that time, however, conditions have not shown any change for the better, and this absence of activity has resulted in a slump in the Baltimore market. With so slight a demand for fuel, quotations are naturally heavy; operators accept almost any price from consumers.

At the coal piers of the Western Maryland, Baltimore & Ohio, Pennsylvania and Northern Central, contract coal is moving freely. Little or no business, other than contract, is handled over these piers. Spot business in this city has about entirely gone.

Buffalo, N. Y.

There is again some report of improvement in the bituminous trade, but it is not general. As a rule both operators and jobbers have settled down to wait for the fall trade. Final transactions are down to about carting wages, and some members of the anthracite trade are also accused of cutting prices in order to give their teams something to do.

Reports continue that the smaller mines, both in the Allegheny Valley and Pittsburgh district, as well as those farther away, are running very light, if at all. Some of the operators refuse to sell their coal unless they get a living price, but there are still too many who will sell at cost rather than shut down. In some cases mining is so irregular that the men are leaving and looking for work elsewhere.

There is no change in bituminous prices, the regular quotations from Pittsburgh being $2.57½ for three-quarter, $2.47½ for mine-run and $2.10 for slack. Coke is somewhat more active, but prices are not very steady, general quotations remaining on a basis of $4.50 for 72-hour Connellsville foundry. Activity in steel promises more strength to this trade soon.

The demand for anthracite is very strong, all sizes being scarce, with stove very hard to get and not promising to be plenty right away. Lake shippers find themselves bound to do what they can to make up lost time in that department, while at the same time they try to satisfy other customers. The situation is very hard to manage.

Columbus, Ohio

The feature of the coal trade in Ohio during the past week was the award of several of the large railroad fuel contracts which have been hanging fire for some time. The Perre Marquette contract, which calls for approximately 1,000,000 tons, was divided up among a number of the Ohio operators in several fields. The price was 95c., which is the same as the previous year, with the added cost of mining included. The Lake Shore contract, which calls for about 2,000,000 tons, was awarded at the same figure. This contract was also divided up among Ohio operators.

Another feature was the continued activity in the Lake business. The tonnage shipped to the Northwest via the Lakes is large and shows a tendency to increase. Every boat is being chartered weeks in advance and the ore trade is running good.

The steam business is still a trifle slow, which is due to accumulated stocks. Generally speaking the demand is fair and as soon as the surplus is used up a better tonnage is expected. Prices in steam grades are holding their own.

The quotations in Ohio fields are:

Hocking Valley	
Domestic lump	$1.50
¾-in	1.35
Nut	1.15
Mine-run	1.15
Nut, pea and slack	0.65
Coarse slack	0.50
Pittsburgh No. 8	
¾-in	1.10
Mine-run	1.00
Coarse slack	0.40
Pomeroy Bend	
Domestic lump	$1.50
¾-in	1.35
Nut	1.20
Mine-run	1.15
Nut, pea and slack	0.70
Coarse slack	0.50
Kanawha	
Domestic lump	1.50
¾-in	1.30
Mine-run	1.10
Nut, pea and slack	0.65
Coarse slack	0.50

Cleveland, Ohio

Conditions in the past week have not improved over the week previous. There is considerable coarse coal coming in, as well as slack, which is disposed of with much difficulty, and at very low prices. Pittsburgh slack has sold as low as $1.30, and other coals correspondingly lower than the previous week.

The lake trade was also notably dull, on account of insufficient coal coming in to take care of the excess boat tonnage. The ore trade continues brisk, and boats are returning light, rather than wait

for coal, and in order to take care of the excess vessel tonnage there will have to be a material increase in coal receipts. There will, no doubt, be strenuous efforts put forth to have coal come forward more rapidly; a very large tonnage is destined to go forward during the season.

Detroit, Mich.

Bituminous — Market prices at this point are slightly improved. West Virginia slack has advanced to 60c., mine-run to 90c., ¾-in. lump to $1 and 1½-in. lump to $1.10, f.o.b. mines. Very little Ohio coal is coming in; prices on Pittsburgh No. 8 slack are 80c., mine-run $1.15, ¾-in. lump $1.20, Jackson Hill lump $2.50, f.o.b. mines.

Pocahontas mine-run has advanced from $1 to $1.25 per ton f.o.b. mines. There is very little, if any, coal on track today, and for this reason prices are advancing steadily; it is predicted that there will be a still further advance all along the line.

There have been several large cargoes passing this point for uplake ports; 80,000 tons, approximately, are the figures given for June. The tendency has been to stock up heavily at the docks to assure the large consumers at the upper ports a full supply for the winter months.

Anthracite—These prices are soaring beyond the limit, apparently, and it is predicted by the representative of an Eastern operator that hard coal would bring from $9 to $12 per ton. There still seems to be a serious shortage, and the jobbers find it difficult to place orders for large amounts. If this continues, the reaction will be appalling this winter.

Coke—The market is very firm on this product. Connellsville foundry is quoted at $4.85 net ton, and Semet Solvay is at $5, f.o.b. Detroit.

Hampton Roads, Va.

The market at Hampton Roads during the past week has been very dull, one of the dullest for some time; there have been very few sales. Most of the tonnage moving has been on previous contracts and the prevailing price is still $2.70.

Figures showing amount of coal dumped for the month of June are not yet obtainable. The indications, however, are that the figures will be about the same as for May, with perhaps a small falling off for June.

Charleston, W. Va.

For the first time during the present year the mines of the New River and Pocahontas districts are closed. This condition was brought about by the congestion at tidewater, causing a shortage in the mining districts, and for the further reason that many of the miners take several days vacation during the week of July 4. The closing of the mines will afford an opportunity for the relief of the congested conditions at tidewater. The shipments to the Lakes are heavier than a year ago, and despite the fact that not as much has been loaded, there is no serious congestion, as the coal is being dumped without waiting for boats.

Prices have undergone no changes either at tidewater or the Lakes during the past month. Here and there a slight drop has been reported for inland shipments, but even those are from 5 to 8c. above the prevailing prices of a year ago.

Nashville, Tenn.

There is no change in the situation in the West Kentucky coal fields. Most of the mines are running half time, though some of them are not fortunate enough to be able to make over two days a week.

Prices remain about the same, with slight fluctuations occasionally, due to certain sizes being on demurrage. This condition has not prevailed as much this season as heretofore, which, of course, has had a tendency to keep summer prices at a slightly higher level than formerly.

Domestic business in this field will start to move in a small way in July and become fairly active the first of August.

Birmingham, Ala.

The feature of the Southern market at this time centers largely around important railroad contracts, some of which have been closed during the week. The usual amount of such business has come to the Alabama coal operators thus far and they hope to land more before contracting has ceased.

There will be an increase in the iron-furnace demand during July, of possibly two furnaces. The indications are that there will be at least three idle furnaces to go into blast by the middle of July, but on the other hand, there is a probability of one going out for repairs. The retirement of the Alabama Consolidated Coal & Iron Co. from the commercial market, because of the receivership, is expected to be only temporary, but its present idleness is assisting the other mines.

Indianapolis, Ind.

The Indiana mines are generally all being operated, and the output is very good. The miners had their first semi-monthly pay since Apr. 9. This was not as large a sum as usual, due to the limited number of days worked. The July payment will be an average distribution because of a full 15 days' work.

The present mining rate of wages is the largest ever paid in Indiana. With the exception of the Block Coal mines, which pay from 5 to 10c. a ton for all coal under 3 ft. 1 in. in thickness, there is no competition under the present contract. Hence the work of mining and stripping is going along nicely.

Chicago

The market has been unusually quiet so far as Eastern domestic coal is concerned. Smokeless has been selling at $1.10 for mine-run and $1.50 for egg and lump; sales, however, have been few. Some mine-run has been moved at $1 at the mines, but there has not been enough of this business to establish a market.

There is a fair movement of anthracite and an increasing demand for by-product coke. There was an advance of 10c. a ton on all sizes of coke July 1 in accordance with a previously arranged plan.

Prevailing prices at Chicago are:

Sullivan County	
4-in. lump	$2.47
Egg	2.37
Mine run	1.99½
Screenings	1.77@1.87
Springfield	
Domestic lump	$2.32
Steam lump	1.97
Mine-run	1.82
Screenings	1.62@1.72
Clinton	
Domestic lump	$2.27
Steam lump	2.12
Mine-run	1.92
Screenings	1.67@1.72
Pocahontas and New River	
Mine-run	$3.15
Lump and egg	3.55

Coke—Prices asked for coke are: Connellsville, $4.85@4.90; Wise County, $4.75; byproduct, egg and stove, $4.65; byproduct, nut, $4.55; gas house, $4.65.

Minneapolis—St. Paul

The coal trade in the Twin Cities and the Northwest is extremely dull for this time of the year. Something unusual is the total absence of buying from the retail trade for domestic stocks. This time of the year has always been very active in this branch but the dealers have shown a tendency to hold off, notwithstanding the wholesalers advice to replenish stocks now. Prices are bound to advance within a month or two and dealers who are reluctant to buy now will have the worry incident to waiting for shipments.

At the head of the Lakes stocks are arriving in good shape, although the receipts are below those received up to this time last year; during May and June, however, many cargoes of ore were shipped East and boats loaded with coal will soon be returning. Anthracite shipments are far below normal, but it is reported that a number of boats are on the way and others are being loaded to capacity at the Eastern docks.

The steam business in the Twin Cities is very quiet and will most likely continue so for the balance of the summer. A few contracts are being closed up gradually and there are a number holding fire. Railroads have not been in the market as yet and in all probability will not contract until in the late summer. Prices on all grades are reported weak, but are holding as well as can be expected.

St. Louis, Mo.

The market has been unusually quiet the past week, and there is still an inclination to continue cutting prices, even though at present they are below the cost of production. This was very much in evidence in the awarding of the contract for the City Water Works, where there were ten bidders, three of whom were within 5c. of each other.

Indications are that business will be considerably better after the first week in July. There is an exceedingly good demand for anthracite, and in many instances it is bringing a premium. Smokeless is strong at anywhere from $1.75 to $2 at the mines, for lump and egg, with a $2.50 rate to St. Louis.

The prevailing prices are:

Franklin County	
6-in. lump	$1.35@1.50
3x6 egg	1.35@1.50
Nut	1.35@1.50
No. 2 nut	1.25@1.35
Screenings	0.90@1.00
Carterville	
6-in. lump and 3x6 egg	$1.20@1.35
Nut	1.15@1.25
Screenings	0.90@1.00
Mine-run	1.05@1.10
Mount Olive	
Lump	$1.15@1.25
Nut	1.00@1.10
Screenings	0.90@0.95
Standard	
2-in. lump	$0.85@0.95
6-in. lump	0.90@1.00
Screenings	0.85@0.90
Mine-run	0.85@0.90

San Francisco, Calif.

Exceptionally warm weather for some time past has restricted the sale of coal to the householder. The demand has been limited to kitchen use, and since the gas companies are making a strong fight for this trade, there has been little call on the retail dealer. Stocks, however, are not accumulating, as deliveries have been light, and further, quite an appreciable quantity has been taken by the liners running to China and Japan, which do not have oil burners on account of not being able to procure that fuel in the Orient.

Current prices to the trade are as follows:

Wellington (British Columbia)	$8.00
Pelau Main (Australia)	8.50
Rocky Mountain	8.50
Cumberland	12.50

Portland, Ore.

While it is yet early in the season, no vessels have so far chartered for carrying coal from Australia to the Columbia River this fall; usually by this time two or more are reported fixed. Freights are high and this tends to put importers on the waiting list.

The weather here is changeable, sometimes cool or cold and then again almost tropical, quite out of the ordinary for this time of year, but the effect is not very marked on the coal trade. Dealers have not yet announced storage rates here and say they do not know whether any will be made this summer or not, since no word to that effect has yet been received from the mines.

Production and Transportation Statistics

Buffalo Lake Shipments

Lake shipments of anthracite from this port to the end of June were 480,500 tons, as against 1,196,285 tons to the same time last season. The showing for the past month is 150,000 tons short of June last season, so there is not much prospect of making up the shortage right away.

Pennsylvania Railroad

Statement of coal and coke carried on the P. R.R. Co.'s lines east of Pittsburgh and Erie during May and the first five months with the increase or decrease over the same period last year, in short tons:

	May	5 mos.	Difference
Anthracite	109,341	3,688,943	—1,439,243
Bituminous	3,495,016	18,956,936	+2,542,665
Coke	1,150,080	5,340,912	+ 888,798
Total	4,754,437	27,986,791	+1,992,220

The Car Situation

The net surplus of cars in the United States and Canada made again a large shrinkage, according to the June 20 statistics of the American Railways Association. There was on that date a surplus of cars totaling 73,464, but a shortage of 5746 reported from other points left the net surplus at 67,718, which is a decline of 18,668 from the figures reported two weeks ago.

As in the previous weeks of declines, the shrinkage has been entirely due to the demand for coal cars following the settlement of the anthracite strike. In the two weeks ended June 20 the coal-car surplus shrank from 35,785 to 14,230. Two weeks previously the passing of idle coal cars into use had reduced the surplus of that class of rolling stock by 33,000.

Norfolk & Western Ry.

The following is a comparative statement of the coal and coke shipments over the lines of the N. & W. Ry. for the months of May, 1911-12, in short tons:

Destination	1911	1912
Coal		
Tidewater, foreign	94,505	123,380
Tidewater, coastwise	212,656	379,303
Domestic	1,218,438	1,452,812
Coke		
Tidewater, foreign	3,856	12,687
Domestic	133,627	93,862
Total	1,663,082	2,062,044

Tonnage for the West Virginia mines was as follows, in short tons:

From	Tipple Coal	Total Coal
Pocahontas	20,519	1,245,129
Tug River	3,717	207,549
Thacker	4,220	230,650
Kenova	7,811	84,453
Total	36,267	1,767,781

Note.—Total shipments of coke, originating entirely in the Pocahontas field, amounted to 91,043 tons.

Foreign Markets

Great Britain

The coal market remains in a very dull condition, with little business passing. Prices are approximately as follows:

Best Welsh steam coal	$4.14
Seconds	3.84
Thirds	3.60
Best dry coals	4.20
Best Monmouthshire	3.66
Seconds	3.54
Best Cardiff small coal	2.34
Seconds	2.22

* The prices for Cardiff coals are f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days, less 2½ per cent.

Financial Notes

Colorado Fuel & Iron Co.—There are rumors to the effect that a new $300,000,000 corporation is said to be forming to take over the Colorado Fuel & Iron Co. and the Colorado Industrial Co.

Alabama Consolidated Coal & Iron Co.—By an order of the United States District Court the Baltimore Trust Co. has been restrained from selling $1,250,000 of its improvement and refunding bonds of the Alabama company, held as collateral for the security of $330,000 in notes.

New Rivers Collieries Co.—The shares of this company are listed on the Boston Curb, preferred stock being quoted at about 26 and the common at 3. In the original promotion of this company two shares of common were given as a bonus with each share of preferred at $100; the preferred is virtually selling at about $30 per share.

Nova Scotia Steel & Coal Co., Ltd.—This company's profits for 1911 amounted to $1,019,392, being the largest in its history with the exception of 1910. The sum of $96,124 has been added to the reserve funds and $73,881 expended for betterments and improvements has been written off, and $10,577 has been transferred to insurance reserve. There remains to the credit of the profit and loss account $508,544.

Reading Co.—Preparations for the strike are clearly reflected in the figures of the Philadelphia & Reading Coal & Iron Co. for the nine months to March of this year. Gross amounted to $30,921,836 against $24,466,194 in the corresponding period of last year, an increase of $6,455,642, over 26%. Net of $1,561,234 was three times as great as the $315,336 reported a year ago, and it is principally as a result of this that Reading's share balance is running so substantially ahead of last year.

Pittsburgh Coal Co.—It is figured that the preferred stockholders of this company, who are now getting 5% and nothing on their 37% accrued dividends, would be willing to take 137 in 5% bonds to cover the principal and 37% preferred dividend o their shares. Such bonds, it is figured, should be worth 90 and, therefore, would work out a value of 120 for Pittsburgh Coal preferred, now selling at about 92. This would involve an increase in the bonded indebtedness of the company of about $42,500,000, and, calculating on a 5% basis, would increase the annual fixed charges by $2,125,000, but would take the place of the present 5% dividends of $1,353,590 and cancel an equal amount of 7% preferred shares and deferred dividends.

Prices of Mining Supplies

Current Prevailing Prices of Mining Commodities Compiled as a Convenient Reference for Buyers

THE MARKETS IN GENERAL

General business throughout the United States is more active than at any time since 1910 and perhaps since the boom of 1906, although the dullness in a few industries makes it difficult to state whether a new high record has been set. In all trade and manufacturing centers it may be said that the prevailing activity is greater than at any previous time. Bank clearances, an excellent barometer of business conditions, are larger than ever before. Railway earnings are also making new high records as far as gross earnings are concerned. More railway equipment is being utilized than ever before at this season of the year and the demand for labor is phenomenal.

The steel mills are exceedingly active and scarcely a week goes by but what announcement is made that a new mill or blast furnace will be built, or that some plant which was considered uptodate a decade ago will be dismantled. Although this is a presidential year, political conditions seem to have little influence on actual business.

LABOR

The scarcity of labor is marked at all the industrial centers of the country. This is particularly true in and around the Pittsburgh district, where labor is so scarce that the owners of river boats are paying the fines of prisoners at the police stations, in order to get sufficient help to man their boats to New Orleans. The Industrial Commission of Pittsburgh has sent representatives to New York for the purpose of meeting all in-coming emigrants and induce them to go to Pittsburgh; emissaries have likewise been sent to other industrial centers in an endeavor to induce the workmen to go there. Labor is paid about $2 per day in New York, and in the interior $2.25 is common for rough labor, while especially good workmen can readily command $2.50 and even $2.65. Even such poor laborers as those from the north of Europe, the Russians and the Poles, command $1.75 in construction camps in New York State.

IRON AND STEEL PRODUCTS

Consumers of iron and steel all over the country are eager buyers and the facilities of some makers are taxed to the utmost to meet this demand. It has grown up slowly, but steadily for the last six months and now the output of pig iron is at the maximum rate of production ever reached in this country. During the first half of this year the tendency has been to advance prices, but in most cases they are lower now than a year ago, due to the severe cuts made last year. The steel trade feels, perhaps more than any other, the shortage of all kinds of labor, and this has been a potent factor in keeping the output so small.

The leading makers of plates, structural steel shapes and steel bars advanced their quotations $1 per ton, June 26.

Old Material—Notwithstanding a demand larger than usual, the market lacks snap. In the East quotations on heavy cast scrap and wrought pipe are slightly lower, while in other centers the heavy arrivals of scrap from the interior are depressing the market. In New York quotations per gross ton are as follows:

Heavy-melting steel scrap	$11.00@11.25
No. 1 railroad wrought	13.25@13.75
Pipes and flues	9.75@10.00
Cast borings	7.00@ 7.25
Machinery cast, broken up	11.00@11.50
Stove plate	8.75@ 9.00
Malleable castings	10.00@10.50
Wrought turnings	8.25@ 8.50

In Chicago the demand for steel scrap shows a falling off, but this is more ascribable to the heavy arrivals of scrap of all kinds than to a falling off in any one line. The railroads in particular are sending in large quantities of scrap with orders that it is to be placed on the market. Quotations are as follows:

	Per gross ton
Heavy-melting steel scrap	$11.75@12.25
	Per net ton
No. 1 railroad wrought	12.25@12.75
No. 2 railroad wrought	11.25@11.75
Machine-shop turnings	7.25@ 7.75
No. 1 cast scrap	11.50@12.00
Pipes and flues	9.00@ 9.50
Agricultural malleable	10.50@11.00
Railroad malleable	11.75@12.25

In Pittsburgh the advantage seems to be with the buyer now; the seller had the upper hand a month ago. Quotations per gross ton are as follows:

Rerolling rails	$13.75@14.00
No. 1 cast scrap	12.75@13.00
Heavy melting steel scrap	11.75@12.00
Old car wheels	14.00@14.25
Machine-shop turnings	10.75@11.00
Stove plate	10.25@10.50
Grate bars	9.75@10.00

Roofing, Corrugated—The extras to be added to the price of flat sheets for corrugating are 5c. per 100 lb. for 2-, 2½- and 3-in. corrugation; painted, gages from 25 to 28, 15c. per 100; gages 19 to 24, 10c. per 100; heavier gages, 5c. per 100 lb.

The following table gives the price of flat sheets in carload lots f.o.b. the Pittsburgh district.

	Cents per lb.	
	Black	Galvanized
Nos. 10 and 11	1.60	2.00
Nos. 12, 13 and 14	1.65	2.10
Nos. 15, 16 and 17	1.80	2.25
Nos. 18, 19, 20 and 21	1.80	2.40
No. 22	1.80	2.40
Nos. 23 and 24	1.85	2.50
Nos. 25 and 26	1.90	2.70
No. 27	1.95	2.85
No. 28	1.95	3.00
No. 29	2.00	3.10
No. 30	2.10	3.30

In Chicago store prices are as follows:

	Cents per lb.	
	Black	Galvanized
No. 10	2.00	2.55
No. 12	2.00	
No. 14	2.00	
No. 16	2.15	2.60
Nos. 18 to 22	2.15	2.75
No. 24	2.20	2.85
No. 26	2.25	2.95
No. 27	2.25	3.40
No. 28	2.30	3.45
No. 30	2.45	3.55

Cast-Iron Pipe—Makers of this kind of pipe have not revised their quotations in conformity with the higher prices of pig iron. Quotations per net ton of 2000 lb. are as follows f.o.b. the points named:

Chicago, 4-in., $27; 6- to 12-in., $25; larger sizes, $24.

New York, 6-in., $22@23.

Birmingham, Ala., 4- to 6-in., $23.50; 8- to 12-in., $22.50; over 12-in., $21.50.

Steel Rails—The market is steady and the demand large. Quotations on new rails seldom vary, but fluctuations are frequent in the market for old rails. Quotations f.o.b. Pittsburgh are as follows: Standard sections, 50 to 100 lb. per yd., 1.25c. per lb.; 40 to 50 lb., 1.21c.; 12 lb., 1.25c. Relaying rails are $23.50@24 per gross ton for standard sections f.o.b. Chicago; like rails can be had at $21@22 per net ton f.o.b. New York. In Chicago carload lots of light rails are quoted as follows: 25- to 45-lb., 1.20@1.25c.; 15- to 20-lb., 1.25@1.3c.; 12-lb., 1.3@1.35c.; 8-lb., 1.35@1.45c.

Steel Mine Timbers—The leading seller of steel mine shapes reports business very active. An advance of $1 per ton was made in the price on June 26. The present price is 1.3c. per lb., f.o.b. Pittsburgh.

Track Supplies—In Pittsburgh spikes are now held at 1.50c. per lb., base for small lots, although large lots can still be had at 1.45c. Angle bars are 1.5c., while track bolts are 2.2@2.25c., Pittsburgh. In Chicago angle bars are 1.5c.; spikes, 1.55@1.6c.; track bolts with square nuts, 1.95@2.05c.

Bars, Concrete Reinforcing—Prices on both plain and deformed bars are as follows in carload lots f.o.b. Pittsburgh:

	Cents per lb.
¾-in. and larger	1.25@1.35
⅝-in.	1.30@1.40
½-in.	1.35@1.45
⅜-in.	1.45@1.55
¼-in.	1.75@1.85

Bars from stock, Pittsburgh, are usually cut to the required length without extra charge. Prices per lb. are as follows:

	Cents per lb.
¾-in. and larger	1.45@1.55
⅝-in.	1.50@1.60
½-in.	1.55@1.65
⅜-in.	1.70@1.80
¼-in.	1.95@2.05

Wire Rope—Prices are without change. The discount to the larger trade is 42½ and 5% from list, for galvanized, and 50 and 5% for bright.

The net prices of wire rope are as follows:

Diameter in.	Price per ft. Cast steel	Crucible steel	Plow steel
2½	$1.05	$1.24	$1.46
2¼	.85	1.05	1.22
2	.57	.65	.76
1¾	.55	.54	.64
1½	.32	.39	.45
1¼	.23	.28	.32
1	.15	.18	.21
¾	.10	.11	.13
⅝	.07	.09	.10
½	.06	.07	.07

Merchant Pipe—The demand is heavy in spite of an advance of about two points, and consumers continue to buy pipe in large lots. The new discounts on steel pipe f.o.b. Pittsburgh are as follows:

	Black	Galvanized
¾- to 1½-in. butt welded	80%	72%
2-in. lap welded	78%	71%
2½- to 4-in. lap welded	80%	73%
4½- to 6-in. lap welded	79%	71%
7- to 12-in. lap welded	78%	68%

At these discounts the net prices of pipe per foot in carload lots are as follows:

	Steel pipe in cents per ft. f.o.b. mill	
	Black	Galvanized
¾-in.	2.30	3.23
1-in.	3.30	4.65
1¼-in.	4.50	6.30
1½-in.	5.40	7.60
2-in.	7.90	10.20
2½-in.	11.50	15.50
3-in.	15.10	20.40
4-in.	21.50	29.10
5-in.	30.50	42.00
6-in.	39.50	54.80

Nails—Prices have not changed, but an advance is expected at almost any time. Pittsburgh quotations for carload lots to retail merchants are $1.65 base for wire nails and $1.60 base for cut nails.

In less than carload lots to retail merchants the price is $1.75. From jobber's store, New York, wire nails are sold at $1.85@1.90 base; cut nails at $1.80@1.85 base. These prices are per keg of 100 lb.

Merchant Shapes—Prices are unchanged and the demand is good.

Quotations from store, New York, are as follows:

	Cents per lb.
Refined iron:	
1- to 1⅞-in. round and square... / 1½- to 4-in.x⅜- to 1-in..... / 1½ to 4-in.x¼- to 5-in.....	1.80
Rods:	
⅝- and 11/16-in. round and square.	1.90
Angles:	
3x¼-in. and larger.....	1.90
3x⅛-in. and ⅛-in.....	2.30
1½ to 2½x⅛-in.....	2.05
1½ to 2¾x⅛-in. and thicker....	1.95
1 to 1¼x⅛-in.....	2.05
1 to 1½x⅛-in.....	2.10
⅞x⅛-in.	2.20
¾x⅛-in.	2.25
⅝x⅛-in.	3.45
Tees:	
1-in.	2.35
1¼-in.	2.20
1½ to 2½x¼-in.....	2.00
1½ to 2½x⅛-in.....	2.00
3-in. and larger.....	1.95
Beams	1.90
Channels, 3-in. and larger.....	1.85
Bands, 1½ to6x 3/16-in. to No. 8.....	2.10

Lag Screws—The prices of lag screws are unchanged, and cone-point lag screws are sold at a base discount of 80% from list. The net prices are as follows:

	Diameter in inches—Net price per 100		
Length	½-in.	¾-in.	1-in.
3½-in.	$1.04	$2.12	$4.40
4-in.	1.11	2.26	4.66
4½-in.	1.10	2.40	4.92
5-in.	1.25	2.47	5.18
6-in.	1.40	2.82	5.70
7-in.	1.59	3.10	6.22
8-in.	1.68	3.38	6.74
9-in.	1.83	3.66	7.26
10-in.	1.87	3.94	7.78
11-in.	2.11	4.22	8.30
12-in.	2.26	4.59	8.82

Spiral Riveted Pipe—Prices are without change. The following quotations are f.o.b. factory, freight equalized with New York, being figured at a discount of 50, 10 and 10% from list. These are for orders amounting to approximately $250. For large orders, prices are cheaper by 12½ to 20%.

Diameter in in.	Thickness, Birmingham wire gage	*Net price per 100 ft. With bolted joints complete: Plain	Asphalted	Galvanized
3	20	$21.90	$14.21	$20.70
4	18	19.76	21.48	30.74
5	18	23.40	23.70	37.14
6	16	33.05	35.76	49.73
7	16	37.58	40.76	56.82
8	16	43.17	46.80	65.00
9	16	50.06	54.16	74.22
10	14	66.42	71.08	96.15
11	14	71.20	76.57	102.24
12	14	83.75	89.15	118.30
13	14	89.67	96.55	127.98
14	14	99.14	105.51	138.85
15	14	108.05	114.89	151.92
16	14	117.53	124.82	166.58
18	12	167.43	175.95	226.44

*Made in both lighter and heavier gages at corresponding differences in price.

Piling, Sheet Steel—Business is more active and manufacturers are securing some very fair orders. The orders, however, are spasmodic. Prices continue without change at 1.40c. per lb. f.o.b. Pittsburgh. On large orders the figure will be shaded.

Wire—While the demand is not large, it is steady and jobbers have taken large quantities of material. It is expected that trade will slump off from now on. Quotations are as follows in Pittsburgh: For fence wire in less than carload lots Nos. 0 to 9, annealed, $1.55; galvanized, $1.85. Barbed wire from Pittsburgh is held at $1.65 for the pointed and $1.95 for the galvanized. These prices are for carload lots.

In Chicago painted barbed wire is $1.78 and galvanized $2.08 base. Annealed fence wire in carload lots is $1.40 for painted and $1.70 for galvanized. All these prices are per 100 lb.

Bolts—The market is very steady, and with the recent advance in rivets it would not be surprising if a change should be made in the discount on bolts. Prices continue as of last month, common carriage bolts being quoted at 75% and 10% discounts on bolts ⅜x6 in. and smaller. On larger and longer bolts, the discount is 70 and 10%. These discounts on net prices for large lots are as follows:

Length inches	Diameter inches—Net price per 100: ⅜	½	¾
4.....	$0.62	$0.99	$2.34
5.....	0.68	1.13	2.57
6.....	0.75	1.23	2.84
7.....	0.99	1.35	3.05
8.....	1.08	1.46	3.32
9.....	1.16	1.58	3.55
10.....	1.24	1.70	3.80
12.....	1.42	1.94	4.30
14.....	1.59	2.18	4.80
16.....	1.77	2.42	5.28
18.....	1.94	2.65	5.78
20.....	2.10	2.88	6.30

MILL SUPPLIES

Shafting—The market has advanced about two points, but the demand is not especially active. New discounts on cold-rolled shafting are 65% off list for carload lots and 60% for less than carload lots. On carload lots delivery is made in base territories.

The following net prices per foot are based on the discount of 60%:

COLD-ROLLED SHAFTING

Diameter, inches	Cents per foot
¾	3.60
1	5.80
1¼	9.20
1½	12.00
1¾	16.20
2	21.50
2¼	27.00

Belting—The demand is much better than at any time in two years.

The discounts applying to rubber belting are unchanged, best grades being held at 40 and 10% to 50%. Standard, 50 and 10% to 60%. Competitive grades are 60, 10 and 10% to 70%.

RUBBER BELTING, NET PRICE PER FT.

Width, Inches.	2-ply.	4-ply.	6-ply.	8-ply.
3	$0.16	$0.22	$0.33	.....
4	.21	.30	.45	.....
5	.26	.44	.55	.....
6	.30	.51	.65	$0.87
7	.36	.55	.75	1.01
8	.40	.57	.87	1.15
9	.46	.64	.96	1.30
10	.51	.72	1.01	1.44
12	.60	.86	1.36	1.70

Fire Hose—Prices of hose are unchanged. The standard grade of underwriters' cotton rubber-lined hose, 2-in. diameter warranted, 350 lb. pressure, is sold in 50-ft. lengths complete with couplings at 65c. per ft. Common hose, 2½-in. diameter, tested to 200 lb. pressure, is 35c. per ft.

Cotton Waste—Prices are as follows in bales of 100 to 500 lb.: No. 1 white picked cotton waste, 9¼c. per lb.; No. 3, 7¼c.; No. 1 colored, 5c.; No. 3 colored, 4¼c.

High-speed Steel—Prices range from 50@70c. per lb.

Packing—Prices are as follows: Asbestos wick and rope being quoted at 13c.; sheet rubber, 11@13c.; pure gum rubber, 40@45c.; red sheet, 40@50c. Cotton packing can be had at 16@25c.; jute at 3¼@3½c., and Russian at 9@10c.

Lubricating Oils—Quotations continue without change, the following figures being named for 5-bbl. lots:

	Cents per gal.
*Cylinder, dark.....	20@27
*Cylinder, steam, refined.....	14@22
Neutral oils, filtered:	
Stainless white, 32 to 34 gravity..	28@29
Lemons, 33 to 34 gravity.....	17@19
Dark, 32 gravity.....	15@18
Crank case oil.....	15@17

*Prices are according to test.

Explosives—Dynamite of the kind usually used by contractors is approximately 11@13c. per lb., f.o.b factory, in ton lots. Blasting powder, classified as "soda" grade, is sold at $1.20@1.40 per keg of 25 lb. in lots of 10,000 lb.

Exploders, per hundred, are sold at the following prices: 4 ft., $3.60; 6 ft., $4.10; 8 ft., $4.60; 10 ft., $5.10; 12 ft., $5.60; 16 ft., $6.60; 20 ft., $7.50; 20 ft., $9.40; 30 ft., $12; 36 ft., $14.60.

Caps in lots of 10,000 are $7@8 per thousand.

Blasting machines for 10 holes are $12; 25 holes, $20; 50 holes, $40; 100 holes, $60.

MISCELLANEOUS

Petroleum Products—The price of crude oils at the wells has advanced but no change was made during June in the price of the refined products.

In New York, petroleum from tank-wagon delivery can be had at 8c., while auto naphtha and stove gasoline is unchanged at 17¾c. per gal.

Paints—The season has been more active and more paint has been used than last year. An advance in the price of lead brought with it no corresponding advance in the price of white lead in oil. Quotations are unchanged as follows: White lead in oil in 100-, 250- and 500-lb. kegs is 7c. per lb., in 25- and 50-lb. kegs at 7¼c. Red lead and litharge in lots of 500 lb. and over are 7c.

Copper Wire—The demand continues large, and apparently more consumers wish to buy copper wire at around 19c. f.o.b. mill, which is now the price, than when it could have been obtained 4c. cheaper. The price is now 1c. above the price of ingot copper. This allows a fair margin for rolling, but the operation must be quick or the profits are lost in interest.

Aluminum Wire—The price is unchanged at 31c. base.

Insulators—Prices are without change. Glass insulators in lots of more than 1000 and less than 10,000 are sold at the following prices per 1000: Double petticoats, 20 oz., $33; Western Union, $30.25; No. 2 cable, $53.90; No. 4 cable, $210; Muncie type, 7-in., $236.50; No. 3 triple petticoat, 4½-in., $90.75.

Telegraph Wire—For lots of fair size, the wire measured in Birmingham wire gage, the prices in cents, per lb., are as follows: "Extra Best Best," Nos. 6 to 9, 4⅝c.; Nos. 10 and 11, 4½c.; No. 12, 4⅝c.; No. 14, 5⅛c. "Best Best," Nos. 6 to 9, 3½c.; Nos. 10 and 11, 3⅜c.; No. 12, 3½c.; No. 14, 4c. Actual freight is allowed from Trenton, N. J., where it does not exceed 25c. per 100 lb.

Rope—The market is very firm and prices are higher as follows: Pure Manila, 8½@8¾c.; second grade, 7½@7¾c.; hardware grade, 6½7c. Sisal is 6½@6¾.

Paper—The market is steady and firm. Prices are without change as follows:

Per Roll of 500 Sq.Ft.

Rosin sized sheathing, 20 lb.....28c.
Rosin sized sheathing, 30 lb.....43c.
Rosin sized sheathing, 40 lb.....58c.

ROOFING, RUBBER

Per Roll of 108 Sq.Ft.

1 ply—35 lb.....	$0.90
2 ply—45 lb.....	1.10
3 ply—55 lb.....	1.30

Tarred felt is $1.45 per 100 lb. in 1, 2 and 3 ply. Slaters' felt is 60c. per roll.

Portland Cement—The makers of cement in the Lehigh Valley district have, for the last two years, been selling cement at about the cost of production. This was caused by a desire to get business at any cost by some of the smaller and weaker mills. On account of the excess of producing capacity of the mills in the district they dominated the situation. Conditions are changing; the demand for cement is larger than ever before and this is likely to continue so for several months at least. A more important factor is the removal of half the import duty on cement brought from the United States by the Canadian government.

In New York cement is sold at $1.30, with an allowance of 40c. for bags returned. The freight rate per barrel from the Lehigh Valley district is about 30c.

Brattice Cloth—Prices are higher than at any time in more than a year and, in consequence, there has been only a little buying. The high price of jute is one of the contributing causes for the prevailing high level of prices, but a factor that has more influence on the market is the unsettled condition of labor in Great Britain, where most of this cloth is manufactured.

Index of Coal Literature

Monthly list of the world's best articles on coal and coal mining

The following is a list of abbreviations used below:
A.E.G.-Ztg. = A.E.G.-Zeitung.
Am. Lab. Legis. Rev. = American Labor Legislation Revue.
Ann. Mines = Annales des Mines.
Ann. Mines Belgique = Annales des Mines de Belgique.
Austral. Min. Stand. = Australian Mining Standard.
Berg-Huttenmänn.. Rdsch. = Berg- und Huttenmännische Rundschau.
Bull. Am. Inst. Min. Eng. = Bulletin American Institute of Mining Engineers.
Can. Eng. = Canadian Engineer.
Can. Min. Jl. = Canadian Mining Journal.
Chem. Eng. = Chemical Engineer.
Coll. Guard. = Colliery Guardian.
Comp.-Air Mag. = Compressed Air Magazine.
Compt. Rendus Acad. Sc. = Comptes Rendus de l'Académie des Sciences.
El. Eng. = Electrical Engineering.
El. Jl. = Electrical Journal.
El. Kraftbetr. = Electrische Kraftbetriebe und Bahnen.
Eng. Contract. = Engineering Contractor.
Eng. Min. Jl. = Engineering and Mining Journal.
Eng. News. = Engineering News.
Fördertechnik = Die Fördertechnik.
Geol. Mag. = Geological Magazine.
Handel und Ind. = Handel und Industrie.
Int. Mar. Eng. = International Marine Engineering.
Inst. Min. Metal. = Institute of Mining and Metallurgy.
Int. Volkswirt = Internationaler Volkswirt.
Iron Coal Trades Rev. = Iron and Coal Trades Review.
Jl. Soc. Chem. Ind. = Journal of the Society of Chemical Industry.
Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.
Jl. Royal Soc. Arts = Journal of the Royal Society of Arts.
Jl. S. Afr. Inst. Eng. = Journal of the South African Institute of Engineers.
Kohle Erz = Kohle und Erz.
Lumière El. = Lumière Electrique.
Min. Eng. = Mining Engineer.
Mines Minerals = Mines and Minerals.
Min. Sc. Press = Mining and Scientific Press.
Min. World Eng. Rec. = Mining World and Engineering Record.
Mon. Ind. Gaz = Moniteur de l'Industrie du Gazet de l'Electricité.
Montan. Rdsch. = Montanistische Rundschau.
Oesterr. Z. Berg- Huttenwes. = Oesterreichische Zeitschrift fur Berg und Hüttenwesen.
Portefeuille Econ. Machines = Portefeuille économique des machines.
Proc. Acad. Pol. Sc. N. Y. = Proceedings of Academy of Political Science, New York.
Proc. Am. Inst. El. Eng. = Proceedings of American Institute of Electrical Engineers.
Proc. S. Wales Inst. Eng. = Proceedings of South Wales Institute of Engineers.
Rev. Noire = Revue Noire.
Rev. Univ. Mines = Revue Universelle des Mines.
Saarbrucker Berg. Kal. = Saarbrucker Bergmanns Kalendar.
S. Afr. Min. Jl. = South African Mining Journal
Soz.-Technik = Sozial-Technik.
Stahl Eisen = Stahl und Eisen.
Stein-Braunkohle = Stein und Braunkohle.
Tech. Rdsch. = Technische Rundschau.
Techn. Wirtsch = Technik und Wirtschaft.
Tekn. Tidskrift = Teknisk Tidskrift.
Trans. Inst. Min. Eng. = Transactions Institute of Mining Engineers.
Trans. Min. Inst. Scot. = Transactions of Mining Institute of Scotland.
Trans. Inst. Min. Eng. = Transactions of the Institute of Mining Engineers.
Trans. Manchester Geol. Min. Soc. = Transactions of the Manchester Geological and Mining Society.
Ung. Mont. Ind. = Ungarische Montanindustrie und Handelszeitung.
Z. Damptkessel-Betr = Zeitschrift für Dampfkessel und Maschinenbetrieb.
Z. El. Mach. = Zeitschrift fur Elektrotechnik und Maschinenbau.

Note: We shall be glad to obtain for readers, where possible, copies of the papers referred to.

I—GENERAL

The Work of the U. S. Bureau of Mines. J. A. Holmes. Am. Lab. Legis. Rev., Vol. 2, 1, pp. 125-30.

The Application of Business Principles to Mining. G. W. Schneider. Colo. Sch. Min. Mag., Vol. 2, 6, pp. 119-23.

The Mining Industry of Britain. W. Brace. Contemp. Rev. 1912, 4, pp. 457-65, $1.

The Government and the Coal Syndicate. (Kohlenfiskus und Kohlensyndikat.) A. Pohlman. Bodenref, 1912, 4, pp. 94-101, 50c.

New Zealand Mine Regulations. Min. Jl., Vol. 97, 4007, pp. 355-6. (The report of the New Zealand Commission on both coal and metalliferous mines; dealing with prevention of accidents; ventilation of mines; underground sanitation; and miners' phthisis.) 25c.

Anti-Trust Laws and the Coal Industry. Troer, G. W. Min. Minerals, Vol. 32. 11, pp. 644-6. (Treats of the Sherman Act and the Illinois Act; creating combination in restraint of trade a misdemeanor; to prevent the excessive of investment of capital in a given industry.)

Profits and Wages in the British Coal Trade 1898 to 1910. Thomas Richardson and J. A. Walbank. 16mo., 96 p. Ldn., Simpkin, 1912, 40c.

Miners' Minimum Wages. (Der Minimallohn im Bergbau.) Fillunger. Arbeitg.-Ztg., 1912, 10 ill., 15c.

The English Coal Miners' Strike. (Der Streik der englischen Kohlenarbeiter.) Hans Delbrueck. Preuss. JB., 1912, 5, pp. 368-75.

The Coal Strike and After. G. Walker. 19th Cent. 1912, 4, pp. 623-31, $1.

The Coal Trade Dispute. Bd. Trade Lab. Gaz., 1912, 3, pp. 82-6, 15c.

Social Position of Coal Miners and Coal as a National Production. (Sociale Lage der Bergarbeiter u. d. Kohle als nationales Erzeugnis.) W. Beumer. Woche, 1912, 12, pp. 469-72, 25c.

The Miners' Fight. (Germany, England and other Countries.) Der Kampf der Bergarbeiter (Deutschland, Grossbritannien, uebriges Ausland.) Soz. Prax., 1912, Vol. 21, 24, pp. 754-61; 25, pp. 784-93.

The Coal Strike. A. Markham. Quart. Rev., 1912, 2, pp. 554-73, $2.

The Third Extensive Coal-Miners' Strike at the Ruhr-District. (Der dritte grosse Bergarbeiterstreik im Ruhrbecken. O. Niebuhr. N. Zeit. 1912, Vol. 30, 26, pp. 934-44, 50c.

Coal and other Minerals in Bulgaria. Trans. N. Engl. Inst. Min. Mech. Eng., Vol. 62, 4, pp. 4-6, $2.

II—GEOLOGY

Look-out Mountain Coal Measures. Evans, A. W. Min. Minerals, Vol. 32, 11, pp. 654-6, 3 fig., 1 tab., 1 map. (The structure of the mountain is of horizontal beds of limestone, sandstones and shales; formed during the carboniferous period; notes are made of the geological deformation of the strata: thickness of seams; quality of coal on analysis and mining costs.)

The Coal and Iron Industries of Derbysh. and Notts. G. S. Bragge. Assoc. Water Eng., No. 2, 30 May, 1912, pp. 1-6. (The geological features of the two countries are described, the unworked coal in the proved coalfields at less than 4,000 ft. depth is estimated at 7300 million tons available; and in unproved coal fields at 23 million tons concealed resources. The methods of working are described and particulars of coal and iron works given.) 50c.

The Coal Fields of Western Canada. E. Jacobs. Coal Age, Vol. 1, 30, pp. 968-9. (A compilation of various data; the geological and commercial importance of the different fields is briefly sketched; the district is likened to that of Pittsburgh and a similar development predicted.)

Metamorphism and Geological Structure in the Narragansett Basin, Rhode Island. F. H. Lahee. Am. Jl. Sci., Vol. 33, 195, pp. 249-62, 7 fig. (The basin is a body of carboniferous strata, fifty miles long and from fourteen to twenty-five miles wide, with a stratigraphic thickness of two miles.)

III—MINING TECHNOLOGY

Coalbrook Colliery, Heilbron. Orange Free State. South Afric. Eng., Vol. 17, 5, pp. 77-8, 2 fig. (Particulars of the plant, boiler house, motors, headgear and buildings, washing plant, etc., the company owns 17,659 acres coal lands; the present output is about 11,500 tons per month.) 25c.

The New Buck Mountain Breaker. E. L. Cole. Coal Age, Vol. 1, 32, pp. 1032-5, 7 fig. (A modern anthracite plant of 1800 tons daily capacity is here described. The breaker embodies several new and important features of design, notably a belt conveyor for loading out all coal. The structure is of concrete and steel fireproof construction.)

The Buck Mountain Coal Breaker. Min. Minerals, Vol. 32, 11, pp., 637-40. (An illustration of the most advanced practice in cleaning and preparing anthracite; as exemplified in the Buck Mountain mine of the Lehigh Coal Co.; the apparatus is the outcome of the experience of several of the company's engineers.)

Gas Engines for Collieries. E. L. Chorlton. Coal Age, Vol. 1, 30, pp. 973-5, 3 fig. (The author shows how fans, pumps and mining machines may be driven directly by gas engines, and that with air compressors to aid in starting, hoists and haulage drums can be similarly actuated.)

Compressed Air Plant for Mines. L. J. Wightman. Compressed Air Mag., Vol. 17, 5, pp. 6424-6.

A Rope Driven Coal Cutter. Spence, W. L., Colliery Guard., Vol. 103, 2684, pp. 1134-5, 10 fig. (It is suggested that the rope drive is generally more appropriate, and should work better, under average conditions, both natural and artificial, than the electric system carried right up the working face.) 15c.

IV—WORKING OF MINERALS

Mining the No. 8 Seam in Ohio. W. Hibbs. Coal Age, Vol. 1, 32, pp. 1035-7, 4 fig. (A heavy overlying stratum of fireclay occurs and is difficult to handle; the poor top has caused enormous losses of coal; some notes on the best method of controlling same.)

Mining Coal on the Virginian Railroad. F. W. Parsons. Coal Age, Vol. 1,32, pp. 1039-43, 6 fig., 1 map. (A description of a new field containing more than twenty billion tons of high grade minable coal, which has been opened, and low mining costs are probable.)

A Mammoth Seam in Colorado. Coal Age, Vol. 1, 30, pp. 966-7, 3 fig. (The preliminary development is described. The coal which is to be sized and loaded into railroad cars, is dumped at the railroad track level, and then elevated to the top of the screens by means of an inclined conveyor, the customary tipple being dispensed with.)

The Acme Co.'s Plant, Wyoming. J. Simmons. Coal Age, Vol. 1, 31, pp. 998-1001, 8 fig. (A detailed description of one of the largest and best equipped coal mining plants in Sheridan, Wyo. A shaking screen with both lateral and longitudinal motion affords unusual refinement in sizing the lignite coal; employees' residences are 22 ft. 8 in. by 27 ft. 6 in., containing 4 rooms and a bathroom.)

Important British Collieries. Coal Merch., Vol. 2, 610, pp. 513-4, 2 fig. (Particulars are presented of the Cortonwood Collieries, Wombwell; the surface arrangements, the machinery and mining methods, also the coke ovens and by-product plant.)

V—BORING, SHAFT SINKING AND TUNNELING

Diamond Drilling at Porcupine, Ontario. A. E. Hall. School Mines Qrly., Vol. 33, 3, pp. 229-32, 5 tab. (The speeds and costs; no fair comparison of costs can be made unless all conditions are known.)

Diamond Drilling and Bore Hole Surveying. Inst. Min. Metall. Bull., 92, pp. 23-33. (The paper brings the information on these subjects down to date with details of latest records and improvements; in the discussion bore hole surveying instruments are described with a locking and unlocking of the needle device.) 50c.

Boring of Coal. Jaquet, J. B. Aust. Min. Stand., Vol. 47, 1223, p. 359. (It is impossible to bore through loose conglomerate with a bit set with diamonds, except at a ruinous cost; a method and apparatus are described for using the steel cutter shot system of boring; 90 per cent of the boring is done with the steel cutter and only on hard bands of rock is the shot used.) 25c.

Shaft and Slope Construction, 201 Mine, Clinchfield, Virginia. R. G. Johnson. Coal Age, Vol. 1, 30, pp. 970-2, 4 fig. (The construction data of a concrete-lined shaft are given; all concrete was placed by gravity chutes or by special chute cars. The contractors' plant and the central power plant receive special notice.)

Reinforced Concrete as Applied to Mine Shafting. E. R. Jones. Min. Eng. World, Vol. 36-21, pp. 1093-4. (The paper deals principally with the making and installation of concrete; the materials, mixing, moulding the sets, and placing.)

Why Leave Shaft Pillars. Pickering, W. H. and B. H. Colliery Guard., Vol. 103, 2684, pp. 1132-3,

2 fig. (A method is suggested by which the whole or greater part of the pillars can be extracted, the coal also being more cheaply and profitably worked.) 15c.

Reports on the Sinking of New Shafts in Skane, and the Method of Working. (Nagra meddelanden angaende nyare schaktsaenkningar i Skane, samt on darvid anvanda Arbetsmetoder.) J. Svedberg. 42-4, 50c.

Shaft Deepening. W. Hodgson, Jr. Min. Eng., Vol. 16, 215, pp. 51-2, 3 fig., 10c.

External Stemming with Incombustible Dust. (Der Aussenbesatz aus unverbrennbarem Staub.) V. Watheyne and E. Lemaire. Z. Schiesswesen, Vol. 7, 1912, 2, pp. 21-3; 3 pp. 43-5; 4, pp. 72-6. (State of the question. Necessity for simultaneous use of several protective media. External stemming. Results and value of the experiments. Tabulated results.) 50c.

Accidents during the Transport and the Use of Explosives. (Unfalle beim Transport und Gebrauch von Sprengstoffen.) Charles S. Hurter. Z. Schiesswesen, Vol. 7, 1912, 5, pp. 93-6. (Report on accidents in the U. S. A.) 50c.

Blasting by Electricity in Mines: Utah System. Rutledge, J. J. and Hall, C. Min. Eng. World, Vol. 36, 22, pp. 1143-4, 5 fig., 1 map. (Layout of wires on the surface and in the workings; with the shot firing wires arrangement in the mine room, the operation of the system is detailed.)

A Wireless Mine-Firing Device. Dr. Branly. Electrician, Vol. 69, 9, pp. 370-2, 3 fig. (Distant control apparatus are considered and special notice is given to several instruments designed to protect to distant-control system from accidental oscillations or against a continuous stream of disturbing oscillations set up by an enemy.) 25c.

The Shipping and Storing of Explosives. (Zur Verschiffung and Lagerung von Sprengstoffen.) B. W. Drum. Z. Schiesswesen, Vol. 6, 1911, 24, pp. 471-2. (Regulation for shipping, the building of stores and the packing of explosives in the U. S. A.) 50c.

Recent Developments in Explosives. Anderson, A. E. Colo. Sch. Mines Mag., Vol. 2, 8, pp. 171-8. (High and low explosives, detonation of high explosives, and systematic handling in mining.)

VII—TIMBERING, PACKING, ETC.

Systematic Timering. S. L. Goodall. Colo. Sch. Min. Mag., Vol. 2, 7, pp. 145-52, 5 fig. (The system of mining and timbering in the Connellsville District; more particularly the scheme of rib or pillar drawing developed by the H. C. Frick Coke Co. in their coal mines.)

Methods of Preservation of Mine Timbers. McDonald, G. B. Sci. Art. Min., Vol. 22, 22, pp. 512-3. (Deals with the subjects of decay and seasoning of timber; and the matter of preservative treatment. Chemicals, apparatus, and several methods of operation.) 15c.

Hydraulic Filling in European Mines. Bucherer, L. Min. Minerals, Vol. 32, 11, pp. 641-3, 6 fig. (An account is presented of the dry filling method formerly used in Silesia; and the hydraulic methods now in use for strengthening the pillars under the inhabited centers.)

VIII—WINDING AND HAULAGE

The Recent Development of Hauling Machine Drives and of Safety Devices. (Die neuere Entwicklung der Foerdermaechinenantriebe und der Sicherheitsvorrichtungen.) Wallichs. Z. Ver. D. Ing., 1912, 15, pp. 599-600, 5 fig. (Appendix to the article published in 1911 (p. 2002); description of a few new safety devices.) 50c.

Blair's Patent Haulage Bogie. T. C. Futers. Colliery Guard., Vol. 103, 2683, pp. 1082-3, 8 fig. (A heavy endless rope system which does away with the disadvantages of a long length of rope, high speeds, and risk of serious accidents of the main and tail system and also provides a constant steady supply of coal to the shaft bottom.) 15c.

Engine Calculations for Main Winding Shafts. (Die Berechnung der Hauptschacht-Foerdermaschinen.) A. Wallichs. Foerdertechnik, 1912, 2, pp. 25-31, 3 fig. (General conditions of calculation. Statical moments and calculation of dynamic moment of resistance to slip in friction winding engines. Acceleration, retardation and times and methods for the several periods of the velocity diagram.) 60c.

Overwinding and Controlling-Gear for Colliery Winding Engines. J. Black. Trans. Inst. Min. Eng., Vol. 43, 2, pp. 243-7, 2 fold plates. (A description of the Inglis Controller with notes on controllers in general.) $2.

An Interesting Overwind Preventer. Coal Age, Vol. 1, 32, pp. 1037-8, 3 fig. (The arrangement described leaves the engine entirely uuder the control of the operator except when overwind is imminent, and insures careful running by registering mistakes.)

Wire Ropes as Applied to Mining. D. Baird. Trans. Min. Inst. Scotland, Vol. 34, 3, pp. 61-83. (Conclusion of discussion by several members of the Institute.) $1.50.

Electric Mining Locomotives. A. H. Marshall. El. Eng., Vol. 8, 23, Supp. pp. 33-7. (The paper notes that the electric motor loses no time on the road, coaling, watering, boiler tending, and waiting for steam to get up. Locomotives in various mines are described and the subject of the overhead trolley system is handled.) 10c.

IX—VENTILATION

Ventilation Necessary in Shaft Sinking. Compr. Air Mag., Vol. 17, 5, pp. 6434-5. (An account of an accident to a gang who descended the shaft after the firing of a shot; the shaft was 22 ft. in dia., and had reached only 120 ft. down; all the men were made ill; one died from carbon monoxide and nitrous oxide poisoning.)

X—MINE GASES TESTING

Testing for Firedamp. H. Briggs. Trans. Min. Inst. Scotland, Vol. 34, 3, pp. 84-99; 4, pp. 118-28. (Introductory paper read and conclusion of discussion.) $1.50.

Process and Apparatus for examining the Afterdamp produced by Explosives. (Verfahren und Apparat zur Untersuchung der nachswaden von Explosivstoffen). Arthur Wilhelmi. Z. Schiesswesen, Vol. 7, 1912, 6, pp. 112-3, 1 fig. (Collecting the gaseous mixture resulting from the explosion of blasting materials in presence of air.) 50c.

XI—COAL DUST

Coaldust Explosions. George S. Rice. (Kohlenstaubexplosionen) Z. Schiesswesen, Vol. 6, 1911, 23, pp. 447-9. (Nature and explanation of coaldust explosions. Preventive measures. (Watering the mine, sprinkling, strewing mygroscopic salts.) 50c.

XII—EXPLOSIONS

Prevention of Explosions in Mines. J. Hargar. Trans. Inst. Min. Eng., Vol. 43, 2, pp. 132-67, 1 fig., 2 tab. (The only way to prevent absolutely coal dust explosions in most mines is to reduce by 1 per cent the oxygen content, with the addition of ½ per cent of carbon dioxide in the ventilating current.) $2.

The Jed, W. Va., Coal Mine Explosion. Min. Minerals, Vol. 32, 10, pp. 579-83, 1 fig., 1 map. (Local conditions in the mine; the accident probably a gas explosion, influenced by change of barometer. The report and analysis of the ventilation and general conditions observed at inspections prior to the explosion.)

XIII—RESCUE AND AMBULANCE

"Safety First" Underground: the New Bureau of Mines and Its Life Saving Campaign in the Coal Fields. A. W. Page. Worlds Work, Vol. 23, 5, pp. 549-63, ill.

Improved Mine Rescue Apparatus. Coal Age. Vol. 1, 33, pp. 1073-4, 7 fig. (A compound of oxygen and sodium hydrate which liberates oxygen when water is dropped on it, is used in this apparatus; the weight of the oxygen tank being considerably reduced.)

Trials with the Pneumatogen. (Versuche mit dem Pneumatogen). Grahm. Glueckauf. 1912, 9, pp. 346-52, 3 ill., 2 fig. (Description of apparatus model 1910. Experiments carried out at the mining school in Bochum have shown that the apparatus is reliable against fire-damp and coal dust.) 75c.

Emergency Car of the Colorado Fuel & Iron Co. Coal Age, Vol. 1, 30, pp. 982-4, 12 fig. (The features of the emergency car are described; it is intended to supplement the rescue car proper which carries the regular rescue equipment.)

XIV—DRAINAGE, PUMPING, ETC.

Panther Creek Drainage Tunnel. Min. Minerals, Vol. 32, 10, pp. 599-601, 1 fig., 8 profiles. (The Lehigh Coal & Navigation Co. tunnel from Coal Port to No. 2 shaft Nesquehoning; this drainage tunnel is 9700 feet long and is to be extended another 1.5 miles to Summit Colliery. The tunnel is 12 ft. wide and 8 ft. high and in addition to its use for drainage purposes, can be utilized for haulage.)

XV—PREPARATION

Experimental Coal-Washing Plant at McGill University. J. B. Porter. Colliery Guard., Vol. 103, 2681, pp. 983-5, 7 fig. (An account of Canadian preparation of coal and a full description of the McGill washing plant, treating coal reduced to a size below ¾ in.) 15c.

The Screening Problem in Illinois. A. Bement. Coal Age, Vol. 1, 34, p. 1105, 3 fig. (A review of the relative productions of the different sizes in the Illinois fields. The result noted of a change in the method of payment from a lump to a mine-run basis and graphically shown.)

XVI—BRIQUETTES

A new Briquetting Press. (Eine neue Brikette Presse.) Braunkohle, Vol. 10, 1912, 45, pp. 713-6, 2 ill., 5 fig. (Built by Ehrhardt & Sehmer, Saarbruecken. Compact design; all parts easy of access.) 20c.

Conveyor for Briquette Stockyard. (Anlage zur Beschickung eines Brikettlagerplatzes.) Oskar Maus. Z. Ver. D. Ing., 1912, 15, pp. 608-9, 2 fig., 1 ill. (Stolz jig conveyor to transport 22,250 large or 4500 small coal briquettes per hour in either direction.) 50c.

XVII—COKE OVENS

A new Machine for drawing Coke. Gas World Vol. 56, 1452, p. 657, 1 fig. (A coke drawing machine suitable for small works, enables a man standing 15 ft. away from the mouth of the retort, by driving a hand crank, to draw the mass of coke direct into a tilting car; one man can attend to the whole range of retorts; each retort is drawn in less than one minute.) 15c.

Methods of Coke Dust Disposal. C. J. Bacon. Am. Gas. Jl., Vol. 96, 23, pp. 376-7 and 380-4. 4 fig., 7 tab. (The paper contains results of investigations and tests for determining the relative economy of several methods of disposing of a yearly production of approximately 50,000 tons of dust, as well as an accumulated stock of 100,000 tons from by-product coke ovens.)

The Carbonization of Coal in Bulk. E. H. Scott. Gas World, Vol. 56, 1454, pp. 720-1. (The paper gives an outline of the carbonization of coal in large chambers or ovens for metallurgical purposes; and refers to the German coke oven gas being used for lighting purposes, and even obtaining a richer gas than the retort gas; also the obtaining a coke for domestic uses.) 15c.

XVIII—FUEL TESTING

Coking Tests of Coal. R. Lessing. Jl. Gas Light, Vol. 118, 2557, p. 437. (Describes a new apparatus for testing the coking qualities of coals; it takes the form of a fused quartz or silica vessel of reduced size, and the electric furnace made of heating.) 25c.

The Use of Anthracite Coal for Locomotive Fuel J. S. Lloyd. Rail. Eng. Rev., Vol. 52, 21, pp. 472-4 1 chart.

XIX—ELECTRICITY

Economy of Central Station Power in the Coal Mines. G. Bright. Proc. Am. Inst. El. Eng., Vol. 31, 5, pp. 523-34, 6 tab. (Notes of the elements which affect the economy of central station electric energy in the mine.)

Power Plant for Upper Michigan Mines. Iron Age, Vol. 89, 18, pp. 1077-80, 10 fig. (A description of the high-head hydro-electric development on the Marquette Range for the Cleveland-Cliffs Iron Co., using three types of pipe line; the average working head is 580 ft.; on the basis of a 100 second-feet average discharge, 5250 hp. could be generated continuously, development on a 66 per cent load factor 26,500 kw.-hr. per ann.)

The Lancashire Electric Power Co.'s System and Its Application to Lancashire Collieries. Taite, C. D. Trans. Inst. Min. Eng., Vol. 43, 2, pp. 168-186, 6 fig., 3 tab., 1 map plate, 1 fold plate. (An account of the power station is given and a list of motors which are installed in the collieries.) $2.

Electricity in the D. L. & W. Mines. Min. Minerals, Vol. 32, 11, pp. 657-8, 2 fig., 1 tab. (How the Delaware, Lackawanna & Western Railroad Co. applies electric power in its 20 collieries to hoisting, pumping, haulage and lighting. Its output from the northern anthracite field of Pennsylvania was about 8 million tons in 1910.)

Electric Power Plants for Mines. H. D. Jackson. Coal Age, Vol. 1, 34, pp. 1102-4, 6 fig. (Some general and detailed considerations regarding power plant design are presented. Remoteness from other plants and probable life of the mine are important factors in determining the general type of electrical plant.)

The Cascade single and multi-speed Motor. Ellis Williams, M. I. South Afric. Eng., Vol. 17, 5, pp. 89-92, 4 fig. (A description of the Cascade induction motor, both of the single and multi-speed type, and its adaption to mine and general work; read before the South Afric. Inst. Eng.) 25c.

Alternating Systems of Underground Distribution. S. B. Clark and others. Proc. Am. Inst. El. Eng., Vol. 31, 4, pp. 395-414, 8 fig.

The Operation of Electrical Apparatus in Mines by Remote Control. J. Gillespie. Electricity, Vol. 27, 1124, pp. 349-50. (The special object of the control is to regulate automatically the supply from electrically driven pumps to hydraulic accumulators or water tanks.) 10c.

XX—SURFACE TRANSPORTATION

The New Buck Mountain Colliery. E. L. Cole. Coal Age, Vol. 1, 33, pp. 1067-9, 6 fig. (The details of the belt loading and car handling systems are discussed, and the boiler engine and miscellaneous equipment of the colliery described.)

A 600 Ton Coal Bin and Tower. Engin. Rec., Vol. 65, 16, pp. 428-9, 16 fig. (A storage bin built for the Republic Iron and Steel Co., for the open hearth gas producer plant at Haselton, Ohio. The coal is raised and transferred by a conveyor; the I-beam and girder system of construction being exceptionally heavy.)